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JULY 2015

THE RC AIRCRAFT PILOTS' AND BUILDERS' MAGAZINE

Graupner *Ultra Duo Plus 80*
HOW IT PERFORMS ON THE BENCH

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PLUS

- Desert Aircraft Co Tour
- Setting Up a Jeti Central Box
- Florida Jets Coverage & Photos
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- How To Work With ABS Parts

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AN IN-DEPTH FLIGHT REPORT

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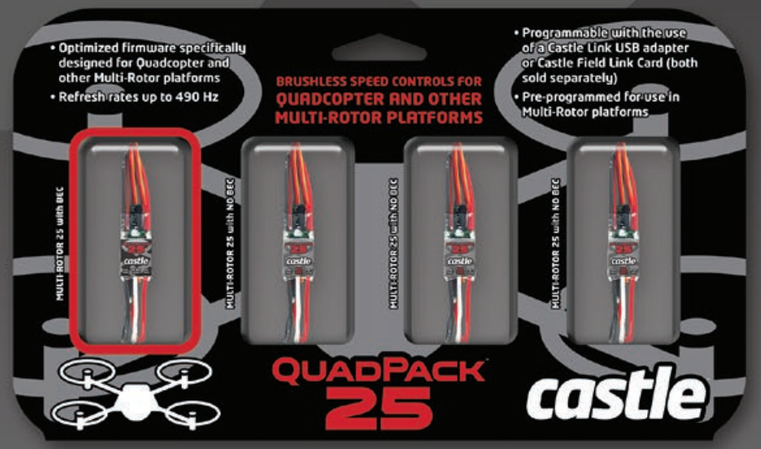
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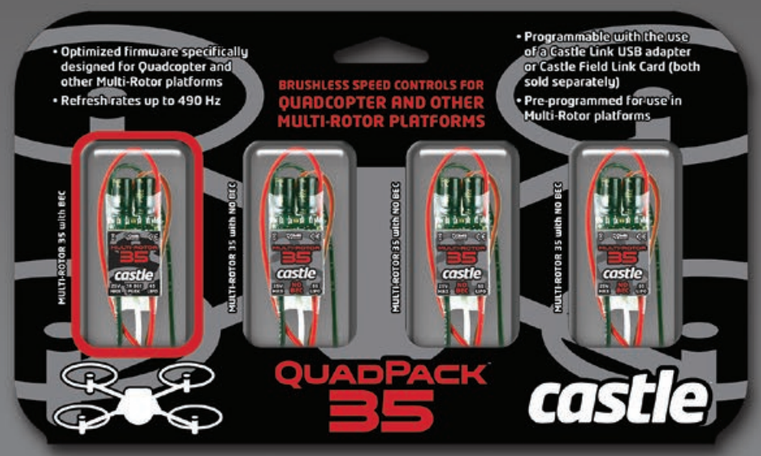
QuadPack 25:
- 490 Hz refresh rate
- 6S LiPo
- 25 amps
- 8 amp peak BEC*

*This package contains one Multi-Rotor 25 with a BEC and three with no BEC. The single BEC supplies power for all 4 controllers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BRUSHLESS SPEED CONTROLS FOR QUADCOPTER AND OTHER MULTI-ROTOR PLATFORMS
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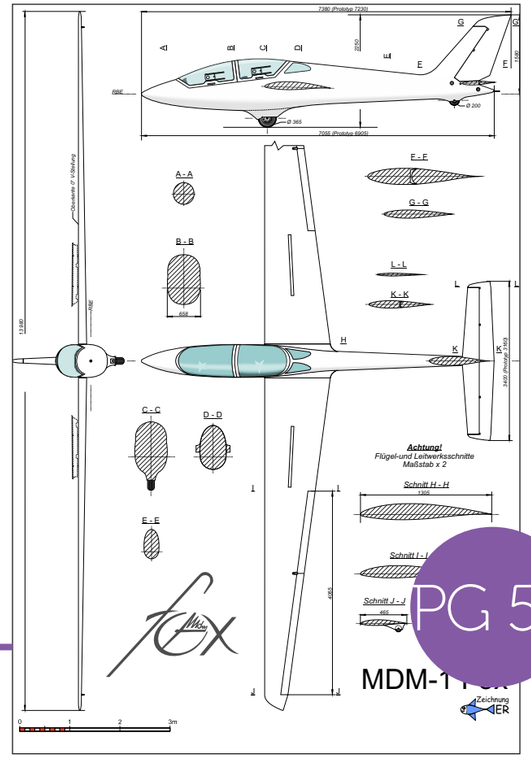

DISCOVER WHY THIS LMR/ALES GLIDER IS THE PERFECT PICK FOR RC PILOTS FROM BEGINNER TO EXPERT.

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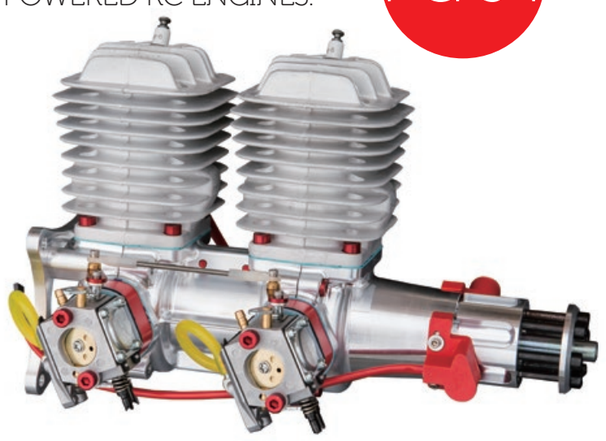

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What I totally love about this job is it keeps my brain active and alive, if not sometimes overworked. I mean, this is a job where one gets to constantly learn about new products, building and piloting techniques, as well as programming transmitters and receivers. Like I've told my family and friends a number of times, "This job is like being a pig in warm mud." It is that good!

For example, this month I got to peruse about 600 photos of airplanes and hardware. Heck, just look at the 12 pages of press releases. I had the fun of reading them and learning what is coming — very cool!

The first article in the issue is our Florida Jets 2015 report. The airplanes you see in this article are dream machines. Most of us will only ever look at the photos, but it turns me on seeing what some modelers are willing to invest in these airplanes. Actually, this kind of report has me wanting for a turbine-powered airplane — how about you? Also, this kind of article puts warbirds in front of us we would not otherwise see at our local airfields.

Our next feature article was an absolute joy to do. While the sunshine in Tucson, Arizona is good, visiting the Desert Aircraft Company engine factory was the best. You see, the owner of Desert Aircraft, Dave Johnson, gave me about a four-hour tour of the factory. He explained the entire engine design and building process that DA uses to manufacture two-stroke engines. My brain ached a bit when I left. That said, I learned much about how two-stroke, performance RC engines are made, so check out the eight-page article.

I've been writing since 1981 when my Scooty design was published in Model Airplane News. Until this issue, I've not had the opportunity to read a good article on how to prepare ABS parts for gluing and painting. Jeff Troy does and outstanding job of it in his column. Don't miss it!

It is sad to say, but the downside of my job is I don't really have the time to compete in any form or fashion. However, I love reading about those that do! So Tom Wolf's article on building scale for competition was very enlightening. There may be a day somewhere in the future when I'll take the time to build such a competition model. For now though, I wanted to share his knowledge in the hope that you'll be a contest winning pilot in the near future. Let me tell you, I welcome this kind of content in the magazine.

My Central Box 200 how-to article was definitely a learning experience. I had a ton of fun setting them up in my 6.6-meter-wingspan Antares racer sailplane and 4.4-meter Fox aerobatic glider. I enjoyed learning how these 15-channel receivers work as well as how to program them. I share the step-by-step process in my report. What I must communicate — no matter what radio system you are using — is that it is fun to program a radio system, especially one that advantages you as a pilot. I also tried to underscore that radio programming is about following a logical sequence, and that patience is a virtue in such an endeavor.

Since I fly a Fox glider, let me tell you, I was studying the Fox drawings by Hans-Jürgen Fischer closely. It was quite enjoyable to see how the full-scale airplane was designed, and the performance it delivers. By the way, if you haven't noticed over the last 22 years, I'm always trying to interest you in gliders and sailplanes — shame on me — not even.

Next, I had the pleasure of reading about how to use the Graupner Ultra Duo Plus 80 battery charger. I've been using Graupner gear since about 1994, so having the chance to learn about the 80 was a joy. As you'll read, this is a charger that is easy to use and very powerful in terms of charging any battery type you'll use in your models and radio systems.

What really "charged my batteries" though was getting to review the Multiplex Heron glider and the 1/3.14-scale Hangar 9 ASW-20 sailplane. Again, I admit I have an unapologetic love of sailplanes and gliders. They are simply the purest form of flight, and to my way of thinking the most significant pilot challenge there is in RC, that is if you want to be an accomplished pilot and not just float the model around the sky. What I did for these two reviews was to fly the models extensively, not just for a couple of quick flights and then write a report. Instead, I've logged at least three hours on the Multiplex Heron and about five hours on the ASW-20 sailplane. It was truly wonderful taking a break from the editors chair to log hours on these superbly performing models. I share my flights in both reviews.

I end my column by asking you to contribute to my enjoyment as an editor. Please submit your content to these pages. If you are like me, you will discover one of the greatest joys in life is passing along the knowledge you have to the people of the RC community. RCSF

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Features

- Programmable Control Management
- Fully Enclosed Design with Metal Gears for Durability
- Capable of Handling 7.4V(2S) or 11.1V (3S) Battery Pack
- Integrated Self Purging Head Valve
- Ready for Electromagnetic Cut-Off Valve
- Included: Retaining Clamps, T-Adapter, Installation Hardware

Price $189.00 (#EMCA90052)

Specifications

Range	4.8 – 12 volts
Current draw	1 – 2.3 amps @ 3.7 – 11.1 volts
Flow rate 4.8 volts	400 ml/min @ 1.2 amps
Flow Rate 7.4 volts	650 ml/min @ 1.6 amps
Flow Rate 11.1 volts	1000 ml/min @ 2.3 amps
Weight	95 g (pump only)
Dimensions	67 x 45 x 27 mm

Distributor

ESPRIT MODEL
1240 Clearmont St NE,
Unit 12
Palm Bay, FL 32905
Phone: 321-729-4287
espritmodel.com

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FLASH 8

Hitec

Hitec just announced that their radio line continues to grow with the introduction of their new Flash 8 transmitter package. Complementing the popular Hitec Flash 7, their latest radio delivers commanding reliability through its expanded performance features and outstanding quick response times. Hitec's built-in Advanced Frequency Hopping Spread Spectrum (AFHSS) technology provides ultra-low latency, precise 4096 resolution and Secure Link compatibility. The Flash 8 let's you store up to 30 models in its memory, enjoy full telemetry functions, and customize your flights with programming options only found on much more expensive radios. Take a good long look at the Flash 8 today. You'll be glad you did!

Features

- Built-in Generation 2 AFHSS / SLT flexibility
- Precise 4096 resolution
- Ultra-low latency
- Fast 7-ms frame rate with Maxima receivers
- Five 3-position and two 2-position switches
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- Digital push button power wwitch
- Push button and jog dial programming interface
- Telemetry capabilities
- Easy-to-read, graphic backlit LCD screen
- Easy-to-change stick modes

Distributor

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Poway, CA 92064
Phone: 858-748-6948
hitecrcd.com

Flash 8 w/ Maxima 9 receiver $279.99 (#176258)
Flash 8 w/ Optima 9 Receiver $299.99 (#176259)
Flash 8 Transmitter Only $259.99 (#176240)

360 CFX 3
BNF BASIC

BLADE HORIZON HOBBY

Blade's new 360 CFX Bind-n-Fly Basic, is designed around the optimized servo geometry platform, with a matched high-voltage power system to deliver performance plus incredible synergy of precision and power. The 360 CFX delivers a mini-class helicopter that gives you the feeling of flying an unlimited 3D helicopter that's much larger.

Complexity and parts count are low on this machine, which makes maintenance simple. Plus you get Blade helicopter innovation with Spektrum™ DSMX® control, plus BeastX® flybarless technology that is renowned. It has been designed to be an advanced pilot's grab-n-go machine.

Features

- Optimized servo geometry
- Advanced, high-voltage 6S LiPo battery setup
- Oversized hardened main shaft with triple ball-bearing support
- CNC aluminum head and frame members
- Castle Creations Talon 35 ESC
- Single-stack carbon fiber side frames
- Spektrum digital high-speed metal gear servos
- Spektrum AR7200BX flybarless control system
- High-torque, brushless outrunner motor
- Includes 360-mm carbon fiber main blades
- Dependable belt-driven tail with aluminum tail boom
- Carbon fiber tail boom supports
- Airbrushed fiberglass canopy with high-gloss finish

Price $499.99 (#BLH4750)

Distributor

HORIZON HOBBY
4105 Fieldstone Road
Champaign, IL 61822
Phone: 217-352-1913
horizonhobby.com

Specifications

Type	Collective pitch flybarless electric helicopter
Kit/ARF/RTF	Bind-N-Fly Basic
Construction	Carbon fiber frame with aluminum mechanics
Canopy	Fiberglass with high-gloss airbrush finish
Main rotor diameter	31.0 in. (790 mm)
Tail rotor diameter	6.89 in. (175 mm)
Height	8.47 in. (215 mm)
Length	26.38 in. (670 mm)
Width	4.33 in. (110 mm)
Weight	30.0 oz (850 g)
Main blade length	14.17 in. (360 mm)
Tail blade length	2.56 in. (65 mm)
Swashplate type	120 degree
Motor pinion	12-tooth helical
Main gear	135-tooh helical
Main gear ratio	11.25
Motor	brushless outrunner, 1800 Kv
Receiver/Gyro	Spektrum™ AR7200BX w/ DSMX® and BeastX
Servos	Spektrum digital high-speed metal gear
ESC	Castle Creations Talon 35
Tail drive	Belt
Control system	120-degree CCPM
Battery	E-flite® 1300-mAh 6S 22.2-V 30C LiPo
Experience Level	Expert
Assembly Required	None
≈Flight times	Four minutes

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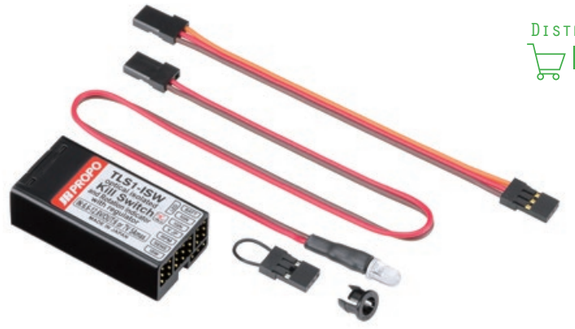

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PO Box 8757
Champaign, IL 61826-8757
Phone: 217-352-7959
jramericas.com

JR America has just announced their new kill switch, which is designed to control an RC airplane's engine on/off safety.

Electronic kill switches are an extremely useful piece of safety equipment in a giant-scale model, and are typically required at AMA sanctioned airfield or events.

This new JR switch weighs less than a half ounce. It provides a safe and quick way to kill a model's engine remotely via the transmitter. Additionally, the JR switch is special in that it provides rpm telemetry data when it is mated to the engine's ignition pickup. The TLS1-ISW also supports dual-ignition inputs — such as on a DA-200 — so controlling two separate ignition modules is a breeze. A programmable RF link delay will prevents engine shut downs due to a momentary hold too, which eliminates forced off-field landings. The switch includes a status condition LED that can be installed in the model.

Features

- Internal voltage regulator for up 12.6 volts
- DC power input — 3S LiPo
- Jumper selectable 6.0- or 7.4-volt
- Dual ignition support for four-cylinder engines
- Compatible with XBus and PWM inputs
- Rpm monitoring through a DMSS transmitter
- Remote control on/off switch
- Programmable delay prevents engine kill due momentary RF hold
- Status LED shows ignition power on or off

Price $84.99 (#JRP03497)

MULTIPLEX ROCKSTAR BIPLANE

Specifications

Wingspan	41 in. (1050 mm)
Length	42 in. (1060 mm)
Weight	63 oz. (1800 g)

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Features

- Four-channel control with ailerons, elevator, rudder, and throttle
- Strong, rigid fuselage combining M-frame technology & Elapor® foam
- Powerful brushless motor
- Preinstalled Hitec HS-82MG metal gear servos
- Aluminum motor mount and chrome spinner
- Detachable cockpit and tinted canopy
- Quick-release wing retainers
- Detachable tailplane and fin
- Seven-minute flight times

RR Price $399.00 (#M264278)
Kit Price $199.00 (#M214278)

FLYZONE L-39 EDF JET

A low, high-speed pass is a thrill most modelers enjoy doing. The Flyzone L-39 EDF jet offers them a fast, easy way of doing them.

Power for the L-39's airspeed comes from a proven performance combo: an ElectriFly HyperFlow™ ducted fan unit driven by an Ammo™ brushless inrunner motor. Engineers used flow analysis and state-of-the-art computer modeling to design the HyperFlow EDF system. The L-39's power system is also designed for 4S LiPo power — more voltage means higher rpm. With 90+ mph (145 km/h) speeds just a fingertip away, flying the L-39 requires the skills and watchfulness of an experienced pilot. And, assembly is so simple that even a beginner could do it.

Note that the airframe is factory-finished, molded AeroCell foam. The brushless power system, servos and hardware are also factory installed. The modeler simply adds a receiver and a charged 4S LiPo pack and the L-39 is ready for flight.

Features

- Finished AeroCell airframe
- Redesigned and optimized ducting
- Factory-installed servos
- Ammo 24-45-3790 inrunner brushless motor
- 35-amp ESC
- ElectriFly 56-mm HyperFlow ducted fan

Price $179.99 (#FLZA3634)

Distributor

GREAT PLANES
P.O. Box 9021
Champaign, IL 61821
Phone: 800-637-7660
greatplanes.com

Specifications

Wingspan	25 in. (635 mm)
Wing area	141 in² (9.1 dm²)
Weight range	24 – 25 oz (680 – 710 g)
Wing loading	24.5 – 25.5 oz/ft² (75 – 78 g/dm²)
Length	31 in. (780 mm)
Transmitter	4-channel
Receiver	Micro
Battery	4S 2200-mAh LiPo

O.S. ENGINES GGT10 GASOLINE ENGINE

Specifications

Displacement	0.594 in.³ (9.73 cc)
Bore	0.945 in. (24.0 mm)
Stroke	0.846 in. (21.5 mm)
Practical rpm range	2,000 11,000
Output	1.58 hp @ 10,000 rpm
Total weight	19.8 oz (561 g)
Engine	15.97 oz (453 g)
Muffler	3.81 oz (108 g)
Requires	unleaded gas w/ 2-stroke oil
Propellers	12x7, 12x8, 12x9, 13x6, 13x7, 13x8

If you are an aeromodeler wanting the convenience of a gasoline-powered engine for your .40-size airplane, O.S. now offers the GGT10.

What you'll wanting to know is that glow plug ignition makes this engine easier to start, along with reducing its overall weight by eliminating the ignition module. The GGT10 performs well while burning affordable, unleaded gasoline. Its PD-08 pump regulates fuel flow for consistent running throughout the flight. Plus, this engine makes for excellent retro-fitting because it fits in the same space as popular AX glow engines.

So if you need an engine to power mid-size aircraft efficiently and economically, the GGT10 may just be the perfect choice.

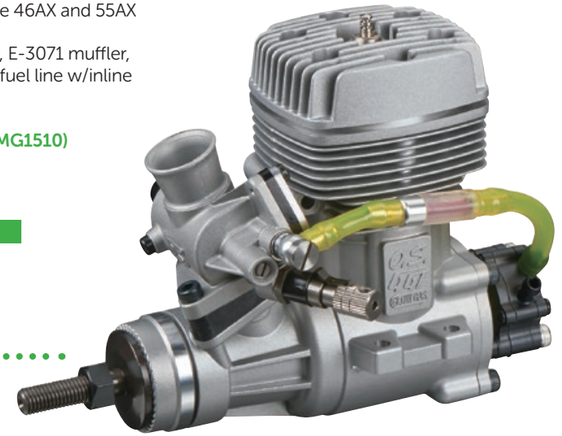
Features

- Easy, glow-driver starting
- Offers unleaded gasoline fueling
- Inexpensive 50:1 gasoline/oil blend
- PD-08 regulating pump ensures consistent fuel flow and performance regardless of tank position, attitude or altitude
- PowerBoost Pipe improves performance from idle to full-throttle
- Includes muffler mounting hardware, drive hub, prop nut and washer
- Forged steel connecting rod features needle bearings at the bottom
- Same mount size as the 46AX and 55AX for easy retrofits
- Includes G5 glow plug, E-3071 muffler, PD-08 pump & Tygon fuel line w/inline filter

Price $319.99 (#OSMG1510)

Distributor

GREAT PLANES
P.O. Box 9021
Champaign, IL 61821
Phone: 800-637-7660
greatplanes.com



HITEC X2 AC PLUS - AC/DC MULTI CHARGER

Distributor

HITEC RCD
12115 Paine Street
Poway, CA 92064
Phone: 858-748-6948
hitecrcd.com

Hitec's new X2 AC Plus charger now delivers expanded capacity and compatibility in very a portable and compact package. It features dual inputs for flexible battery charging either at home and at the airfield. The X2 AC Plus incorporates an innovative power distribution mode that lets you efficiently assign output power based on individual battery requirements. It is capable of charging all battery chemistries too. Note that the X2 AC Plus has a built-in 10-amp power supply, internal balancing circuits, and 10 different charge/discharge profiles, making it a superb charger that you can use anywhere. The X2 AC Plus even includes an App for your smartphone that you can use for remote control via an optional WiFi module — how cool is that!

Features

- Dual channels w/ two independent charge circuits
- DC Mode maximum output 100 watts per port — 200 watts
- Power distribution circuit for ultimate flexibility in AC mode
- 1.) Channel A = 20W + Channel B = 80W = 100W
- 2.) Channel A = 70W + Channel B = 30W = 100W
- Charges NiMH, NiCd, LiPo, LiHV, LiFe, Li-Ion, and Lead Acid packs
- Built-in 10-amp power supply
- Uses 11 – 18 volts DC or 100 – 240 volts AC sources
- Adjustable charge current of 0.1 – 10.0 amps per port
- Internal balancing circuits built in.
- 10 programmable profile settings

Specifications

- NiCd/NiMH cell count 1 – 15 cells
- LiPo/LiHV/Li-Ion/LiFe cell count 1 – 6 cells
- Pb voltage 2 – 20 volts
- Charge current range 0.1 – 10.0 amps
- Maximum charge output AC 100W / DC 200W (100W per port)

Price $99.99 (#44232)

Optional WiFi Module

X2 AC Plus includes an App for your smartphone for remote control.

Features

- Compatible with the X2 AC Plus Charger
- View, change and customize your X2 AC Plus options via smartphone
- Supports Both iOS and Android Devices

Price $22.99 (#44228)

SIG
VAN'S RV-8 "DIAMOND DI"

Airplane designer Richard VanGrunsven has dominated the homebuilt airplane hobby for 40 plus years. His series of all-aluminum low-wing RV designated airplanes provide pilots with the level of flight performance and good looks they want. Since 1973 Van's Aircraft has sold over 18,000 kits and plans, with over 8,000 airplanes completed and flying in 45 countries. In the U.S. alone the number of RVs completed each year exceeds the combined production of all commercial general aviation companies. The RV-8 is Van's latest design that features tandem centerline seating. Like all RVs, the RV-8 climbs well, lands slow, and goes fast.

Seagull Models has made a 20-cc-size RV-8 that inherits all of the great flying qualities of the full-scale airplane. It is responsive, agile, and capable of all the basic aerobatic maneuvers. The airframe is conventionally built-up balsa and plywood construction, with a well-engineered laser-cut design that allows the airplane to be kept lightweight. The UltraCote® covering, plus beautifully molded and painted fiberglass cowl and wheel pants add to its sleek look. The RV-8 is an airplane for the sport aerobatic pilot.

Features
- A classic balsa and plywood ARF
- All major components are factory built and finished
- Modern construction using CAD design and laser-cut parts
- Excellent scale appearance
- Outstanding flight performance
- Operational flaps
- Two-piece plug-in wing for easy transport
- Strong aluminum wing joiner tube
- Dual elevator servos for precision aerobatic flight trimming
- Authentic color scheme of RV-8 N9699D "Diamond Di"
- Covered in genuine UltraCote®
- Detailed cockpit with hand painted pilot
- Painted fiberglass cowling and wheel pants
- Complete hardware pack

Price $291.50 (#SEA249D)

Specifications

Wingspan	70.9 in. (1800 mm)
Wing area	992 in.² (64 dm²)
Length	58 in. (1473 mm)
≈Weight	11 lb (5 kg)
Power gas	20 cc
Power glow	.91 in.³
Power Electric	1700 – 2000 watt; 250 – 400 Kv
Channels	Six needed
Servos	Eight Standard

Distributor

SIG MANUFACTURING COMPANY, INC.
P.O. Box 520
Montezuma, IA 50171
Phone: 641-623-5154
sigmfg.com

PHOENIX MODEL
GENESIS 1/8-SCALE GP/EP ARF

Pheonix's new 1/8-scale model is quick to assemble, quick in the air, and packed with performance. And, it has the great design lines of a scale model in its beautiful blue and white color scheme.

The Genesis comes ready for either a nitro or electric power system. It also comes equipped with retractable landing gear to reduce drag and increase speed, when retracted. The canopy is removable for quick access to the model's radio gear, or to its battery pack in the event you should build it for electric power. A painted pilot figure is included in the kit, and the entire airplane is covered in Oracover®.

Features
- Compatible with GP and EP setups
- Retractable mechanical landing gear
- Plug-in two-piece wing
- Removable canopy for easy battery changes
- Covered in Oracover
- Lightweight laser-cut all-wood construction
- Factory-painted fiberglass cowl
- Painted and installed pilot figure
- All hardware included
- Propeller required

Price $239.97 (#PMMA0315)

Distributor

GREAT PLANES
P.O. Box 9021
Champaign, IL 61821
Phone: 800-637-7660
greatplanes.com

Specifications

Wingspan	60.4 in. (1533 mm)
Length	51.6 in. (1310 mm)
Weight	6.2 – 7.1 lb (2.8 – 3.2 kg)
Power	Nitro or electric power system
Transmitter	6-channel
Servos	5 standard hi-torque servos

E-FLITE
WHIPIT BNF BASIC

Few modeling experiences can be as fulfilling as catching a thermal with a model that has been hand launched! The only energy expended is that of the thrower and the rising air the model glides inside.

The new E-flite Whipit puts this glider experience within reach of everyone that has a want to soar because the model is small and easy to take flying, and it is extremely affordable. If you are looking for a small, lightweight model that you can truly fly anywhere, the E-flite® UMX™ Whipit™ discuss launched glider (DLG) is probably the solution to your needs.

Check it out:

Features
- Ultra-lightweight construction
- Removable, carbon reinforced wing
- Simple rudder and elevator control
- Spektrum™ DSMX® 2.4-GHz receiver/servo unit, installed
- Carbon-fiber boom with internally located pushrods
- Lightweight foam fuselage pod, wings and tail surfaces
- Long flight times on just a 1S LiPo battery
- Graceful, slow-flight performance
- Easy to fly and launch by hand

Requires
- 4-channel-plus Spektrum transmitter with DSM2®/DSMX 2.4GHz
- Ultra micro 150-mAh 1S 3.7-volt LiPo battery
- LiPo charger

Price $69.99 (#EFLU3150)

Specifications

Wingspan	24.4 in. (620 mm)
Length	24.4 in. (620 mm)
Wing area	82.0 in.² (530 cm²)

Distributor

HORIZON HOBBY
4105 Fieldstone Road
Champaign, IL 61822
Phone: 217-352-1913
horizonhobby.com

DX18 STEALTH EDITION 18
CHANNEL TX W/ AR9020 RX AND CASE

The new DX18 Stealth Edition promises the speed and precision of DSMX® technology, with ergonomics and a most impressive suite of pro-class transmitter features.

The DX18 SE Stealth Edition transmitter comes with an all new sophisticated look, an AR9020 receiver, and custom Stealth Edition DX18 durable aluminum carrying case. Spektrum says "you will get all the features and programming options that have made the DX18 Gen 2 one of the best transmitters for pilots who want the pinnacle of programming versatility—now with an array of complimentary items that make this a must-have item for RC pilots."

Features
- Unique Black Matte finish using a Stealth design theme
- Wireless training functionality
- 250 model memory built in
- Voice alerts
- Custom aluminum carrying case
- Neck strap
- Custom branded pre-loaded SD card

Price $929.99 (#SPM18200)

Distributor

HORIZON HOBBY
4105 Fieldstone Road
Champaign, IL 61822
Phone: 217-352-1913
horizonhobby.com

Specifications

Channels	18
Modulation	DSM2/DSMX
Band	2.4-GHz
Receiver	AR9020 9-channel DSMX X-Plus
Programming	Airplane, Helicopter, Sailplane
Memory	250 models
Modes	User selectable modes 1 – 4
Tx) Battery	LiPo
Charger	International and domestic w/ AC adapter
Experience level	Advanced

SIG US NAVY T-34 MENTOR

The Beechcraft T-34 Mentor was designed in 1948 as a more economical replacement for the AT-6/SNJ airplanes the U.S. military used to train pilots during WWII. It was derived from the civilian Beechcraft Bonanza. The T-34 had a long and productive service life in the hands of the U.S.A.F., U.S. Navy, and Coast Guard, as well as many foreign countries. Some T-34s still remain in military service after six decades. Surplus T-34s have become one of the most sought after civilian warbirds because of its economical operation and fine flying qualities.

Now Seagull Models has captured the look and performance of the T-34 Mentor in this beautiful sport-scale Almost-Ready-To-Fly (ARF). The airframe is conventional built-up balsa and plywood construction, yet modern laser-cut design allows the airplane to be kept light and strong. The model is suitable for glow, gas, or electric power. It includes a fixed landing gear with oleo shock absorbing gear struts, but the landing gear mounts are designed to fit optional electric retracts.

Features

- Suitable for glow, gas, or electric power
- All major components are factory built and finished
- Modern construction using CAD design and laser-cut parts
- Excellent scale appearance
- Covered in genuine UltraCote®
- Finished with a matte clear coat for a realistic warbird finish
- Outstanding flight performance
- Operational flaps
- 2-piece plug-in wing for easy transport
- Strong aluminum wing joiner tube
- Painted fiberglass cowling
- Removable top hatch
- Two hand painted pilots
- Dual elevator servos with pushrods
- Complete hardware pack
- A classic balsa and plywood ARF

Specifications

Wingspan	74.8 in. (1900 mm)
Wing area	992 in.² (54.7 dm²)
Length	56.3 in. (1430 mm)
≈Weight	11.2 lb (5.1 kg)
Power gas	20 – 22 cc
Power glow	.90 – 1.20 in.³
Power Electric	1700 – 2000 watt, 250 – 400 Kv
Channels	Six
Servos	Eleven

Price $331.00 (#SEA240Y)

Distributor

SIG MANUFACTURING COMPANY, INC.
P.O. Box 520
Montezuma, IA 50171
Phone: 641-623-5154
sigmfg.com

ICARE MAGELLAN 3.4 ALES

If you are into flying Altitude Limited Electric Soaring (ALES), you'll want to look at the new ICARE is ALES ship the Magellan 3.4.

The Magellan 3.4 ALES has been developed for the electric thermal duration category, like ALES or F5J. It is now Icare's largest version of the popular series of Magellan electric-powered gliders. Icare tells us it has taken almost a year of design and development to create a very competitive airframe, which is lightweight, has great handling, excellent wind penetration, and is affordably priced.

The Magellan 3.4 ALES's wing structure is based on the same molded full-carbon technology that makes the Magellan series so successful. This type of construction results in a very strong, yet lightweight wing, as well as for very accurate airfoil shapes. The fuselage is built using similar technology as the Magellan 110, which is a Kevlar/Carbon layup cured under high pressure to reduce its weight to a minimum. It is extremely strong, stiff and lightweight.

These technologies result in a very competitive airframe, with ease of handling. The long tail moment and optimized wing planform gives it exceptional low speed handling, that will allow you to work small low-level thermals without the fear of a stall — only small rudder inputs are required to hold glider in a thermal turn. Aggressive "crow" settings makes for slow and precise spot landings.

Price $1059.00

Distributor

ICARE/ICARUS
890 ch. d'Anjou unit 1
Boucherville, QC J4B-5E4
Canada
Phone: 405-449-9094
icare-icarus.com

Specifications

Wingspan	134 in. (3.4 m)
Wing area	957 in.² (61.8 dm²)
Wing loading	8.4 oz/ft² (25 g/dm²)
Weight	55 – 63 oz (1.5 – 1.8 Kg)
Airfoil	Ag40 – Ag43 modified
Motor	Mega 16/30/3

SIG FUNKY CUB

Seagull Models aircraft are known as well-engineered traditional Almost-Ready-to-Fly (ARF) models built mostly in wood, with an excellent price to performance ratio.

The Funky Cub is designed to be a fun-to-fly, everyday model that you will enjoy taking to the RC airfield whenever you are wanting for easy relaxing flying. You will like its trainer stability characteristics, with plenty of aerobatic performance built in too. Operating flaps widen the model's already broad flight envelope. The model is designed for glow, gas, or electric power.

Optional color matched Floats are also available (#SEA254FR).

Features

- A classic balsa and plywood ARF
- Flight envelope designed for beginners, intermediate, and expert pilots
- All major components are factory built and finished
- Modern construction methods utilize CAD design and laser-cut parts
- Covered in genuine UltraCote® covering film
- Factory painted fiberglass cowling
- Operating Flaps for expanded flight envelope
- Two-piece plug-in wing for easy transport
- Strong aluminum wing joiner tube joiner
- Durable landing gear
- Designed for gasoline/glow engines or electric power
- Detachable windscreen for easy battery swapping
- Hardware and accessories included

Specifications

Wingspan	70.9 in. (1800 mm)
Wing area	793.9 in.² (51.2 dm²)
Length	50.4 in. (1280 mm)
≈Weight	8.2 lb (3.7 kg)
Channels	Six needed
Servos	Eight
Engine	10- to 15-cc gas or glow
Motor	Equivalent to gas/glow

Price $234.99 (#SEA254R)

Distributor

SIG MANUFACTURING COMPANY, INC.
P.O. Box 520
Montezuma, IA 50171
Phone: 641-623-5154
sigmfg.com

E-FLITE RARE BEAR BNF BASIC/PNP

What began in 1969 as a derelict wreck is currently the fastest straight-line piston-engine aircraft in the world with a record of 528.3 miles per hour. At 500 pounds lighter and 1000 horsepower stronger than a stock Grumman F8F-2 Bearcat, Race #77 is the crown jewel of the Lewis Air Legends collection. To this day, Rare Bear is a favorite to all except the competition.

E-flite's Rare Bear RC airplane version delivers an exhilarating flight experience capable of 100+ mph, right out of the box. Like the full-size, this model has been outfitted with a highly-tuned, oversize power system, and all the unnecessary weight trimmed. This synergy between airframe and power plant maximizes your high-speed piloting thrills, but without sacrificing the super-friendly handling you've come to expect from an E-flite model.

Features

- Capable of 100-mph-plus flight speeds
- AS3X Technology
- Brushless motor w/ 70 amp ESC
- Reinforced Z-Foam construction
- Metal Gear Servos
- Officially licensed trim scheme

Specifications

Construction	Reinforced Z-Foam™ material
Wingspan	34.6 in. (880 mm)
Length	34.0 in. (865 mm)
Wing area	287 in.² (18.5 dm²)
Weight	46.7 oz (1324 g)
Motor	15-size Brushless 1200 Kv
Transmitter	4-channel-plus, programmable
Receiver	Spektrum™ AR636A DSMX w/ AS3X technology (included w/ BNF)
Servos	4) Spektrum A320 16-gram metal gear micro
Battery	3300-mAh 4S 14.8-volt 50C LiPo (required)
Propeller	8x8 electric
Spinner	2.87 in. (73 mm)
ESC	70-amp, switch-mode BEC, brushless ESC
Flight time	≈4 minutes

Price $229.99 (#EFL1250)
$199.99 (#EFL1275)

Distributor

HORIZON HOBBY
4105 Fieldstone Road
Champaign, IL 61822
Phone: 217-352-1913
horizonhobby.com

SIG
STEEN SKYBOLT

Designed by an RC modeler named LaMar Steen in 1970, the full-scale Skybolt became the most successful a two-place homebuilt fully aerobatic biplane in the world. Over 450 Skybolts have been built and flown in the U.S., and another 200 or so in 29 other countries. It is larger and easier to handle than smaller biplanes, yet is capable of unlimited aerobatics. The Skybolt is a straightforward, honest, and absolutely beautiful biplane.

Seagull Models has created an outstanding Almost-Ready-To-Fly (ARF) 15-cc-size version of the Skybolt. It incorporates the same classic good looks and great flight performance of the full-scale Skybolt. Difficult free-style maneuvers and the full slate of aerobatic maneuvers are routine for this RC airplane. The airframe is conventionally built-up balsa and plywood construction, yet the laser-cut design allows the airplane to be kept lightweight. The UltraCote® covering, plus beautifully molded and painted fiberglass cowl and wheel pants add to its sleek look. It is a superb airplane for sport aerobatic flying and flight demonstrations.

Features

- A classic balsa and plywood ARF
- All major components are factory built and finished
- Modern construction using CAD design and laser-cut parts
- Outstanding aerobatic performance
- Upper and lower ailerons for rapid roll rate
- Dual elevator servos for precision aerobatic flight trimming
- Authentic color scheme of Skybolt N250SB "Batman"
- Covered in genuine UltraCote®
- Detailed cockpit with hand painted pilot
- Three-piece top wing with strong aluminum wing joiner tube
- Two-piece bottom wing with strong aluminum wing joiner tube
- Painted fiberglass cowling and wheel pants
- Complete hardware pack

Price $324.50 (#SEA237B)

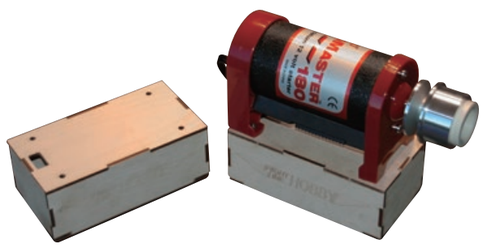
Specifications

Wingspan	61 in. (1550 mm)
Wing area	1023 in.² (66 dm²)
Length	48.2 in. (1224 mm)
≈Weight	9.3 lb (4.2 kg)
Engine	15-cc (.90 in.3) gas or glow
Channels	Six needed
Servos	Six standard

Distributor

SIG MANUFACTURING COMPANY, INC.
P.O. Box 520
Montezuma, IA 50171
Phone: 641-623-5154
sigmfg.com

STARTER BATTERY BOX



Flight Line Hobby, a division of Aspect Aviation, has just introduced the SBB, the Starter Battery Box.

They told us that the SBB allows you to use conventional three- or four-cell 2200- to 3300-mAh LiPo batteries to power your glow engine starter. The laser cut plywood box is quick to assemble and can be custom finished — assembly and mounting hardware is included. The SBB eliminates cords and clutter.

As active modelers Flight Line recognized that the cord from a starter to a separate battery or power panel was cumbersome. Batteries, zipped tied or duct taped to a starter, was no answer.

So, their answer to the problem was the SBB, which has been designed to fit commercially available starters like the Hobbico® Torquemaster 180 and 90 and the Hanger 9® Power Pro, but it can accommodate other starters by drilling the appropriate mounting holes. Older Sullivan starters can be adapted as well. The SBB is offered as a stand alone kit for only $15.99, with a starter, or as a complete package with the starter and battery.

Distributor

FLIGHTLINE HOBBY
1192 South Lapeer Rd
Lake Orion, MI 48360
Phone: (877) 891-8359
flightlinehobby.com

GIANTSCALENEWS.COM
A FORUM TAKING A HUGE LEAP FORWARD

If you're looking for news, how-to articles or just a place to share your airplane projects and happenings with friends there is no better place to point your browser than giantscalenews.com.

GiantScaleNews.com is a forum dedicated to RC pilots and builders that have a need and want for news and information about those airplanes that are consider large, powerful and beyond the norm of the average model. GiantScaleNews is a growing community that prides itself on getting the information you need in front of you as you need it. GiantScaleNews is also a forum that prides itself on high-quality content you will not find in other internet forums, with Sleepy Cinch and Bart Coccohiola managing a site that is not only informative but just plain fun to be use and participate.

At GiantScaleNews you will find forums for: 3D; Scale; IMAC; Jets; Soaring; Engines, Motors, and Turbines; Radios, Telemetry, Electronics; and Everything Else. Plus, GiantScaleNews has Events, Groups, Classifieds, and Vendor support pages. Suffice it to say, GiantScaleNews is a place you'll want to be if you are into giant-scale airplanes of any type.

So, point your browser at GiantScaleNews.com to sign up. When you do you'll discover you are part of like-minded community of modelers that will help you get the most enjoyment from your hobby.

360 CFX 3
BLADE HEAD CONVERSION

Multi-blade mechanics have been a design challenge that the performance RC helicopter community has been wanting to solve since flybarless control technology first came to the forefront. Until now, finding out what it was like to fly a high-performance helicopter with a three-blade head has been a significant investment.

Now that the all-new Blade 360 CFX high-voltage helicopter is available, you too can convert your Blade machine to the three-blade performance system with this easy-to-do conversion kit.

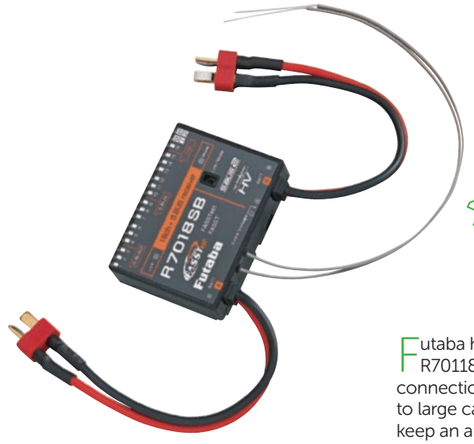
Features

- Increased cyclic performance
- Increased stability at lower head speeds
- Flybarless system changes not needed
- Easy to update

Price $49.99 (#BLH4752)

Distributor

HORIZON HOBBY
4105 Fieldstone Road
Champaign, IL 61822
Phone: 217-352-1913
horizonhobby.com



FUTABA
R7018SB 2.4-GHZ FASSTEST DUAL BATTERY RX

Futaba has just introduced their new R70118SB receiver. It has dual battery connection ports, so it can be connected to large capacity batteries as a way to keep an aircraft flying safely if one of its batteries should fail or drop voltage. The R7018SB is a dedicated 18-channel receiver, with Futaba Advanced Spread Spectrum Technology (FASST), FASSTest protocols, SBus/SBus2, and high-voltage compatibility. It includes both standard and SBus output ports, plus an extra voltage port for a model's separate power system. The receiver also allows for a wide array of Futaba telemetry sensors to be utilized.

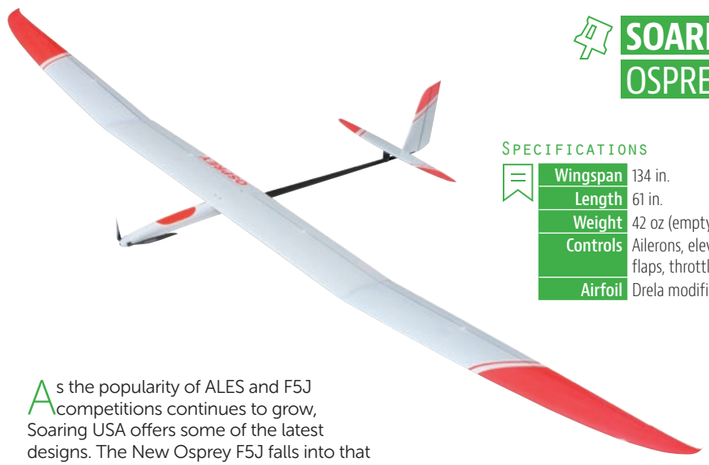
Price $249.99 (#FUTL7676)

Specifications

Weight	1.48 oz (42 g)
Dimensions	2.15 x 1.59 x 0.64 in. (54.6 x 40.4 x 16.3 mm)

Distributor

GREAT PLANES
P.O. Box 9021
Champaign, IL 61821
Phone: 800-637-7660
greatplanes.com



SOARING USA
OSPREY F5J

As the popularity of ALES and F5J competitions continues to grow, Soaring USA offers some of the latest designs. The New Osprey F5J falls into that category.

The Osprey F5J is designed with unique features that make this model a worthy competition glider. The wings short center panel and longer tip design, coupled with generous dihedral, makes it a fantastic turning model. While this glider is contest proven, it's also amazingly docile and a great choice for honing one's thermal soaring skills. The three-piece wing construction is composite fiberglass, with ample carbon fiber reinforcing throughout, including a carbon-wrapped spar system and solid carbon joiners. The fuselage pod is made of carbon fiber and Kevlar® that is mated to a strong carbon boom. The fuselage comes with a pre-installed firewall. The removable elevator is the full-flying type that is mounted on a strong reinforced V-mount pedestal. The vertical stabilizer is affixed to the boom, with the pushrod slots being pre-cut. This model comes with a complete hardware package, fuselage pushrods, wing control rods, and control horn clevises.

Specifications

Wingspan	134 in.
Length	61 in.
Weight	42 oz (empty)
Controls	Ailerons, elevator, rudder, flaps, throttle
Airfoil	Drela modified

Distributor

SOARING USA
827 N Glendora Ave
Covina, CA 91724
Phone: 626-967-6660
soaringusa.com

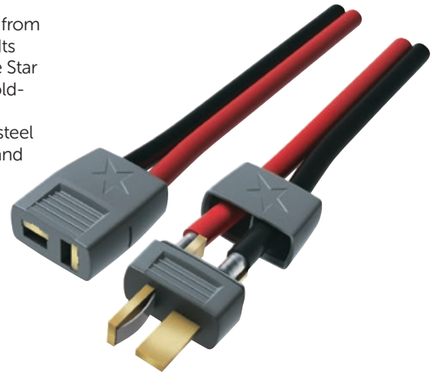
HOBBICO STAR PLUGS

Hobbico has just introduce an option for high efficiency power plugs: the Star Plugs.

The new Star Plugs are easier to use and 100% compatible with one of the most common polarized plugs in RC. So modelers can give them a try it on a new pack without the work of changing the plug in their model. Their unique design also makes for faster, easier, and neater installations by eliminating the need (and work) for heat shrink tubing. The plug has a rear cap that separates from the main body. Modelers slide the rear cap up the leads before soldering and slide it down afterwards, where it snaps tight to the plug's main body. The rear cap also feature a center isolator, a simple feature that effectively prevents terminals from shorting.

Like the cap, the main body is molded from a heat- and impact-resistant polymer. Its tapered shape and grip strips make the Star Plug easy to separate and connect. Gold- and nickel-plating on terminals ensure excellent conductivity too. A stainless steel spring ensures that connections start and stay tight, even after hundreds of uses.

Price **Star Plug pair $2.99 (#HCAM4001)**
Male Star Plugs (2) $3.49 (#HCAM4010)
Female Star Plugs (2) $2.59 (#HCAM4020)
Female Star Plugs (4) $4.90 (#HCAM4021)



SPECIFICATIONS

Weight	0.19 oz (5.4 g)
Wire Gauge	12AWG (w/ rear cap installed)
Wire Gauge	10AWG (w/o rear cap installed)
Dimensions	1.36 x 0.61 in. (34.5 x 15.42 mm)

DISTRIBUTOR

GREAT PLANES
P.O. Box 9021
Champaign, IL 61821
Phone: 800-637-7660
greatplanes.com

JETI RCDROIDBOX

Jeti's new RCDroidBox is designed to collect and processes telemetry data produced by flight control systems in RC airplanes, but it can also be used in cars, boats, etc. The RCDroidBox allows the user or copilot to watch and monitor data while RC airplane is in flight. Data can be presented in a chart, text or audio format, and recorded — the data can then be stored, modified, and shared.

The RCDroidBox solution consists of both hardware and software. The hardware is the Bluetooth adapter. The software is the program running on an OS Android device.

The RCDroidBox is powered by a 4- to 15-volt source. RCDroidBox allows real-time monitoring and recording of telemetry data using JETI Duplex or Duplex EX protocol. The system consists of both hardware and a software part. The hardware is the actual RCDroidBox Bluetooth adapter and the software is an application running on a device with the Android operating system, such as cell phone or tablet.

DISTRIBUTOR

ESPRIT MODEL
1240 Clearmont St NE,
Unit 12
Palm Bay, FL 32905
Phone: 321-729-4287
espritmodel.com

Price **$109.00 (#JETIMBTCDS)**

JETI INLINE SINGLE BEC

If your models are running high-voltage systems with non, the new Jeti Inline Single BEC is made for you. The Jeti Inline Single BEC is designed to regulate the input voltages from 5.5- to 8.4-volt power sources. Its output voltage gets regulated to 5.5 volts and delivers up to one amp of current, such as you'd find in a dedicated Heli gyro/tail rotor servo. Further, this BEC is design to works with any servo.

Check it out because a voltage regulator dedicated to individual servos is a great way to protect all the control servos and the airplane's receiver.

SPECIFICATIONS

Type	Linear regulator
Max input voltage	24 volts (8.4 recommended)
Min input voltage	5.5 volts
Output voltage	5.5 volts
Output current	1 amp continuous/15A peak
Weight	2.5 g
Max #servos	one
Connector	Universal JR/Hitec/Futaba
Applications	Airplanes/Helicopters
Dimensions	19mm x 9mm x 6.5mm

Price **$20.00 (#JETIREGJ-SB)**

DISTRIBUTOR

ESPRIT MODEL
1240 Clearmont St NE,
Unit 12
Palm Bay, FL 32905
Phone: 321-729-4287
espritmodel.com

SIG KADET SENIORITA EP ARF

SPECIFICATIONS

Wingspan	65 in. (1651 mm)
Wing area	800 in.² (51.6 dm²)
Length	64.7 in. (1389 mm)
Weight	4.8 – 5.0 lb (2177 – 2268 g)
Wing loading	13.8 – 14.4 oz/ft² (42 – 44 g/dm²)
Electric Power	Outrunner 400 – 700 watts, 700 – 1000 Kv, 35- to 42-mm case
ESC	Brushless 45- to 75-amp
Battery	3 – 4S, 3000- to 4000-mAh LiPo
Channels	Four need
Servos	Four standard

Since 1987 the KADET SENIORITA has been built and flown by literally tens of thousands of beginer RC pilots, helping them to earn their RC wings. The designer, RC pioneer Claude McCullough, knew that the key to learning how to fly an RC model was being able to slow the model down to allow the pilot time to think about their next control input.

This new Almost-Ready-to-Fly (ARF) version of the legendary KADET SENIORITA has been "sporterized" with the addition of large barn door style ailerons and a tail dragger landing gear with wheel pants. This new model is perfect for RC pilots of any skill level who want relaxing flying sessions, doing picture perfect touch and go landings at the airspeed of a walk. Finally, the KADET SENIORITA SPORT has the kind of beauty and performance that only a balsa built models can offer

DISTRIBUTOR

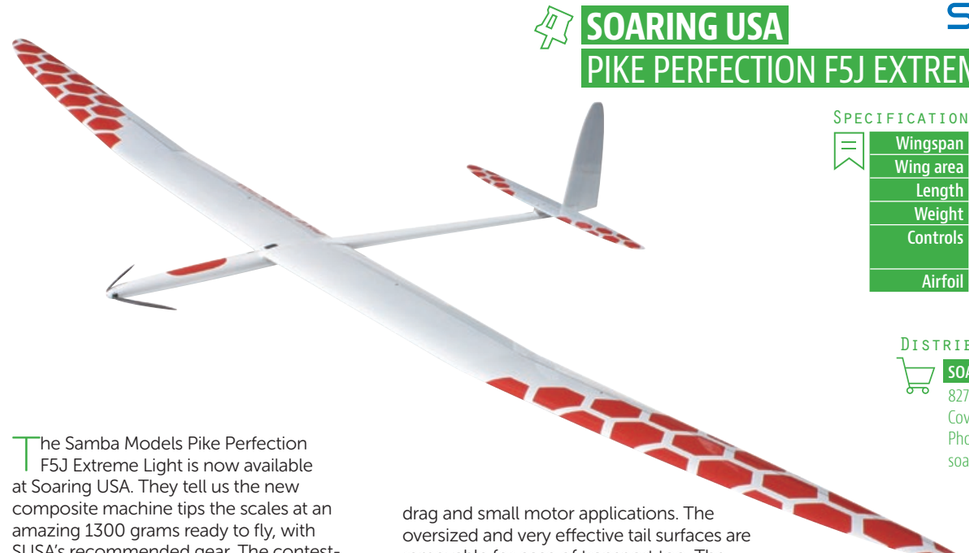
SIG MANUFACTURING COMPANY, INC.
P.O. Box 520
Montezuma, IA 50171
Phone: 641-623-5154
sigmfg.com

Features

- Handcrafted All Wood ARF
- CAD drawn, laser cut, & factory jig assembled
- Two-piece wing that mounts on a strong aluminum wing tube
- Fiberglass cowling and wheel pants
- Magnetic hatch for easy battery changes
- Formed aluminum landing gear
- Adjustable mount for electric motors
- Covered with UltraCote® premium film
- Wheels, pushrods, and complete hardware package
- Photo-illustrated assembly manual

Price **$249.99 (#SIGRC109EPARF)**

SOARING USA PIKE PERFECTION F5J EXTREME LIGHT



SPECIFICATIONS

Wingspan	146 in.
Wing area	1177 in.²
Length	70 in.
Weight	36.5 oz (empty)
Controls	Ailerons, elevator, rudder, flaps, throttle
Airfoil	PK

DISTRIBUTOR

SOARING USA
827 N Glendora Ave
Covina, CA 91724
Phone: 626-967-6660
soaringusa.com

The Samba Models Pike Perfection F5J Extreme Light is now available at Soaring USA. They tell us the new composite machine tips the scales at an amazing 1300 grams ready to fly, with SUSA's recommended gear. The contest-winning two-piece wing design is efficient and extremely sensitive to lift. The Pike's wing construction is incredibly lightweight, with a combination of Rohacell foam and spread-tow 40 gm/m2 and 25 gm/m2 fiberglass towards the tips. The main spar is Tenax UMS 40 skinned. The 2.4-Ghz-friendly fuselage is streamlined for less drag and small motor applications. The oversized and very effective tail surfaces are removable for ease of transport too. The overall Perfection design keeps the weight low in the models for better low-speed circling.

Take a look at this Samba Mode's F5J machine if you are looking for contest-winning glider.

Price **$2399.95**

1/4 Scale Hall Cherokee II

G336

$499.99

The 1/4 scale Hall Cherokee ARF was based on the 1/4 scale plan from David Smith that was published in Quiet Flyer magazine. The all wood construction of the model captured the original essence of the home built glider designed by Stan Hall, with structure almost identical to the full size glider.

Wing Span 130.7 in / 3320 mm
Wing Area 1190 sq in / 76.8 sq dm
Flying Weight 8.3 lbs / 3780 g
Fuselage Length 64.5 in / 1637 mm
Requires: 5-channel radio w/ 7 Standard servos

All wood structure covered with ToughLon covering. Servo operated tow hook provided.

- Optional fiber glass scratch guard available.

- Wing bag included for carry around protection.

ToughLon

* Premium hand iron-on covering film.

All wood structure covered with ToughLon covering. Servo operated tow hook provided. Wing bag included for carry around protection. Optional fiber glass scratch guard available.

MINIMOA G106 1/5 scale Vintage Glider ARF

* Detachable stabilizer. * Detachabled built-up rib wings.
* Pre-painted fiberglass fuselage.

Wing Span 134 in / 3400 mm
Wing Area 1175 sq in / 75.5 sq dm
Flying Weight 6.6 lbs / 3000 g
Fuselage length 54 in / 1370 mm

$349.99

Requires: 3-channel radio w/ 2 standard servos and 2 mini servos

Aure EP E104S

$169.99

* Fiberglass fuselage and built-up rib wings.
* Comes with Outrunner Motor (KM28321030) and Propeller Adaptor (HW2340100).

Wing Span 79 in / 2010 mm
Flying Weight 48 oz / 1350 g

Requires:
4-channel radio w/ 2 standard servos and 2 micro servos (2.5 kg cm torque) for ailerons, 20A brushless ESC, 3 cells 11.1V 2100 mAh Li- Po battery & charger

The Big Wings E268XM

Wing Span 120 in / 3035 mm
Wing Area 2800 sq in / 180.6 sq dm
Flying Weight 10 lb / 4600 g
Fuselage length 42.5 in / 1075 mm

$599.99

Requires:
2-channel radio with Elevon mixing,
2 high torque standard size servos

* 10 foot glider with wing loading of about 8 oz/ sq. ft., excellent soaring and thermal capacities and likely the largest 2 channel glider on the market.
* Pre-painted fiberglass fueslage.
* Balsa built-up rib wings with aluminum wing tube.
* Detachable vertical fins for easy transportation and storage.

Optional electric power package

$329.99

225W Outrunner Motor X 6 pcs
Mounting Bracket X 6 sets
Counter-rotating Propeller X 6 sets
Electric Wires

Requires: Additional radio channel for the throttle, 6 sets of 25A ESCs, 3 X 4000 mAh 11.1V Li-Po battery and charger

Sky Runner EP E240R

$109.99

Wing Span : 49 in / 1240 mm
Flying Weight : 23.7 oz / 670 g

Requires : 4-channel radio w/ 4 micro servos, 20A brushless ESC, 3-cell 11.1V 2100mAh Li-Po battery and charger

Thermal Sailor E231

Wing Span: 90.5 in / 2300 mm
Wing Area: 874 sq in / 56.4 sq dm
Flying Weight: 52.6 oz / 1490 g
Fuselage Length: 46 in / 1175 mm

$139.99

Detachable 2 piece wing.
Comes with geared speed 550 motor.

Requires:
3-channel radio w/ 2 standard servos
25A speed controller with brake and 8 cells 1800 mAh battery

SZD-45 Ogar GM048P

(Pre-assembled Combo)

Wing Span : 98.5 in / 2500 mm
Wing Area : 667 sq in / 43 sq dm
Flying Weight : 46 oz / 1300 g
Fuselage Length : 45 in / 1145 mm

Requires: 4-channel radio, 20A brushless ESC, 3 cells 11.1V 15C 1800mAh Li-Po battery and charger.

$219.99

Ideal for first person video.
Camera mounted inside the compartment.
Easy cut outs for mounting camera.

Sky Walker EP E182N

$129.99

Wing Span: 63 in / 1600 mm
Wing Area: 420 sq in / 27.1 sq dm
Flying Weight: 17 oz / 480 g
Fuselage length: 33 in / 835 mm

Comes with Outrunner Motor and Propeller Adaptor.

Requires:
3-channel radio w/ 2 micro servos, 15A Brushless ESC, 2cells 7.4V 1000mAh Li-Po battery and charge

Thermal Rider EP E201S

$139.99

Wing Span: 78 in / 1980 mm
Wing Area: 665 sq in / 42.9 sq dm
Flying Weight: 32 oz / 900 g
Fuselage Length: 40 in / 1020 mm

Comes with Outrunner Motor and Propeller Adaptor.

Requires: 3-channel radio w/ 2 mini servos, 20A brushless ESC, 3 cells 11.1V 2100mAH Li-Po battery and charger

SkyNova

Novice to advanced flyer in one complete package.

SkyNova with multi-dihedral wings and aileron wings, 6 channel radio (Mode 1 or Mode 2 available.), Outrunner Motor KM28251025, Propeller Adaptor HW2340100, 20A Brushless ESC, 9 x 6 Propeller, 3 cells 11.1V 1800 mAh Li-Po battery and charger.
(Battery may not be included in some countries.)

All-in-one Complete Package

Wing span (multi-dihedral) - Wing Span: 62.9 in / 1600 mm
Wing Area: 428 sq in / 27.6 sq dm
Wing span (aileron wings) - Wing Span: 48.8 in / 1240 mm
Wing Area: 338 sq in / 21.8 sq dm

Begin with the 3 channels self-recovering multi-dihedral wings to learn the basics, and advance to full house 4 channels aileron wings for hot aerobatics flying.

$179.99

Requires : 8 AA batteries.

All products specifications and prices are subject to change without notice.

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BNF Basic
(EFL13500)

Patented Carbon-Z® construction proved that airplanes like the 85-inch span E-flite® Carbon-Z Cub can deliver a truly exceptional big foam experience. Now that attention to lightness, airframe strength and convenience is available in a warbird. The big 78-inch span Carbon-Z T-28 boasts operational flaps, electric retracts and can be easily ready to fly in the time it takes to charge your 6S flight battery. Combined with carefully tuned AS3X® technology, you get flight quality that feels like it's been tuned by experts.

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FLORIDA JETS 2015

JET-POWERED FUN IN THE SUN AT PARADISE FIELD!

BY BARRY VAUGHT
PHOTOS BY BARRY VAUGHT

The UPS DC-10 is on final approach and turns to line up with the runway for landing. As soon as it taxies to the flight station, an F-104 is given the green paddle to take off, roaring down the runway into the clear blue skies of Central Florida. You are at Paradise Field, Lakeland Linder Regional Airport, except the F-104 is 177 inches long, and the UPS DC-10 is 124 inches in length. Florida Jets-Jet Together is a fun, exciting, relaxing event for RC model jet enthusiasts the world over. Frank Tiano and everyone involved run a polished four-day Jet-Together for all attendees, with motor home parking, tents, fresh hot food, restrooms, jet products vendors, and home-made ice cream available.

Florida Jets brings back fond memories of the movie Top Gun, so you will hear Top Gun music playing in the background. You may even see some of the scale airplanes from the movie and that time period shown and flown.

Yes, some of the jets are monster size, and the builders and pilots may take years to complete their masterpieces. The details in the scale airplanes are modeled after full-scale

Ali Machinchy's Airworld F-104 was built by Trond Hammersted. It is 1/4-scale, with a 177-in. wingspan and is powered by a B300F turbine. Ali and Trond took home Best Military Jet and Critics Choice awards.

Robert Pannell's scratch built DC-10 is 1/18 scale and is 124 in. long. It has a 112-in. wingspan and weighs 41 lb. Power comes from two Schubeler DS-94 HDT ducted fans, with electrons from a two 12S in parallel LiPo Packs. Control is by a Futaba 14MZ transmitter, with the model using 12 channels and 24 servos. It has scale outboard and inboard leading edge slats. Robert took home Best Electric Jet Performance award

Jeff Stubbs Skygate BAE Hawk is 1/3.8 scale, has a 99-in. wingspan and weighs 58 lb. A KingTech 210 turbine provides power, with a Spektrum DX18 used as the transmitter. There is no engine hatch, so everything has to be accessed from the front, which Jeff developed for quick access.

This is David Shulman's Aviation Design Diamond. It sports a 97-in. wingspan, is 132 in. long and weighs 42 lb. The model uses a Kingtech 210 turbine. David controls it with a Futaba 18MZ that uses a PowerBox SBUS system. The David earned the Special Recognition award. David thrilled the fans with very low, super-fast passes.

Randy Clarks' Jet Legend Yak130 is built as a 1/4-scale model. It is 113 in. long, has a 95-in. wingspan, and weighs 58 lb. The model gets power from two Jet Central Cheeta turbines. It is fitted with a JR XBus DMSS system, with control from a JR 14XGE transmitter. It earned a Special Recognition award, which was sponsored by RC Sport Flyer Magazine. Randy's Yak 130 is highly modified with scale details such as drop tanks, rockets, a cockpit scale lighting system, and speed brakes with lines.

Mr Top Gun, Bob Fiorenze's, was flying a Yellow Aircraft A/C F-14 (Black Bunny), which is no longer available. The model has a 86-in. wingspan extended and is 46 in. when swept. The model is 84 in. long and is powered by twin Jets Mund VT 80 turbines. It weighs 34 lb and uses 15 control channels as well as 13 mixers. Bob got a well deserved Best Craftsmanship Award. Bob was the First Mr Top Gun in 1989.

Jack Diaz's Fouga Magister is 1/4 scale and built from Belgium Phillip Avonds Kit. It has a 89-in. wingspan and tips the scales at 33 lb when fitted a KingTech 100 turbine, scale speed brakes. Control is by a Spektrum DX18 transmitter. It took home the 2014 Top Gun Expert Class award.

jets that sometimes are still be flown today. Former full-scale A-10 U.S. Air Force Pilot, Craig Gottschang, built an MIBO Gen3 A-10 that was scaled after one flown by Captain Kim Campbell (aka "Killer Chick") in during the 2003 Operation Iraqi Freedom. Craig's scale A-10 pilot is also female. We thank Craig Gottschang for his service to our country and for helping to preserve our history.

Rei Gonzalez's was flying this all wood Vampire, which was built from a Kerry Sterner kit. The builder was Frank Tiano and model is 1/4-scale, with a 120-in. wingspan. The model weighs 50 lb with a Jet Central Cheetah turbine. Rei uses a DX 18 transmitter with this model. The full-scale aircraft was manufactured by de Havilland during the World War II to harness the newly developed jet engine and became the first jet aircraft to cross the Atlantic Ocean.

It is always nice to meet families at the airshows, and see them enjoying their time together. Robert and Amy Pannell traveled from cold, snowy Cincinnati, Ohio. Robert worked for a large airfreight company and wanted to make a jet like the flown by his company. He designed and built a giant 1/18-scale UPS scheme DC-10. The DC-10 looks and performs very scale like in the air, and you would think it was a full-scale UPS jet. Robert sets a good example for everyone, as he hands out a pre-printed specification sheet on the DC-10. This is a great example of how to showcase your airplanes. The photographers and writers will thank you.

Robert Pannell's scratch-built UPS DC-10 has working flaps, spoilers,

Craig Gottschang's MIBO Gen3 A-10 was built as 1/7-scale, which sports a 120-in. wingspan. It weighs 65 lb and is fitted with two JetCat P120SE turbines. Craig's model is controlled by a JR10X transmitter, with a Weatronic 12-22R receiver. Craig was a full-scale A-10 U.S. Air Force pilot in the late 1970s. The A-10 is scaled after one flown by Captain Kim Campbell (aka "Killer Chick") during the 2003 Iraqi Freedom operation. Craig's A-10 pilot is also female. It garnered the Best Multi Jet Performance award.

Peter Goldsmith's Skymaster F-9F Cougar is shown here during a "dirty pass" for the crowd. The F-9F is powered by a JetCat P140 RX and weighs 39 lb without fuel. Pete's model and piloting earned him the Most Outstanding Jet Flight award.

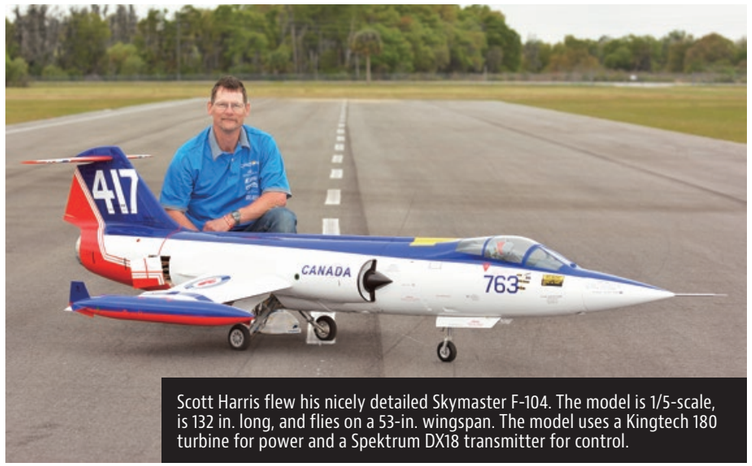
Richie Holt was flying this BVM Ultra Budweiser Bandit, which made the crowd thirsty. Ritchie has been associated with heavily sponsored by Budweiser NASCAR racing team. He wanted to design his own paint scheme and completed the design after about two months. Picking out the right colors was a challenge and the final results speak for themselves.

Anthony Jr. and Tony Sr. Greco's scratch built this Honda Jet. They did not have plans so it was eye-balled from a photograph. The model is made of plywood and balsa construction. It has a 111-in. wingspan, and weighs 50 lb when powered by two Jet Central Rabbits. They're using a DX18 transmitter that talks to Spektrum receiver and servos. They took home the Best Civilian Jet award.

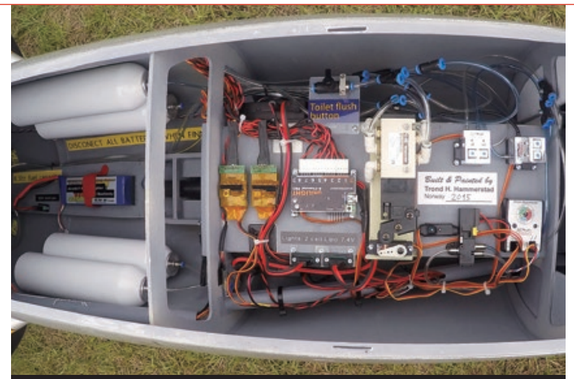
Jason Bauer flew his F-16 Thunderbird, which is a 1/6-scale model that flies on a 78-in. wingspan. It weighs 32 lb and is powered by K140 turbine.

speed brakes, and scale outboard and inboard leading edge slats. Robert is most proud of the molded carbon fiber slats, which required a great deal of engineering to design and build. They add significant realism, also benefitting the DC-10's performance. Robert is currently building a Giant 747-400, 144-in. wingspan, 160-in. long, four Schubeler HST 94 ducted fans. We can't wait to see it fly.

There were more large jets at the event this year than in the past. Pilot Ali Machinchy and builder Trond Hammersted are always exciting to be around. You never know what surprises they have in store for you.



Scott Harris flew his nicely detailed Skymaster F-104. The model is 1/5-scale, is 132 in. long, and flies on a 53-in. wingspan. The model uses a Kingtech 180 turbine for power and a Spektrum DX18 transmitter for control.



This is a look inside the fuselage of Ali Machinchy's monster-size F-104. Trond Hammersted labeled the landing gear air release valve button as the "Toilet flush button" as a joke to Ali. It actually is a safety feature when working on the F-104.

Barry Hou's F-16 is a BVM model. It was piloted by Kriss Gunter. The model uses a K180 turbine for thrust. Kris controls the model with a DX-18 transmitter.

Peter Harasiewcz's Audi Futura weigh is a 36 lb without fuel. It uses a Behotech 220 turbine. The model was very nicely finished so it took home the Best Sport Color Scheme award.

Ecuador's Emilio Bruzzone's Airworld F-100F is shown here. It was built by Trond Hammersted and is 1/5 scale, with an 89-in. wingspan. The model is 111 in. in length and weighs 57 lb, with power coming from a Behotec JB220 turbine.

A large shipping crate arrived and Ali and Trond assembled the largest jet to ever participate at Florida Jets. The custom-built 1/4-scale, 177-in. long Airworld Modellbau F-104 is breathtaking, and the craftsmanship in the model is astounding. This was its maiden flight, with the F-104 performing flawlessly. Ali's expert piloting is always a thrill, so to have him piloting his new monster F-104 was a treat.

Randy Clark and his Yak 130 were awarded a Special Recognition award, which was sponsored by this magazine, RC Sport Flyer.

Builder Trond Hammersted made the F-104 in his home town, Skein, Telemark, Norway. He started building airplanes as a child, and advanced to building jets about 10 years ago. His progression in building took a giant leap at the 2006 Jetpower Fair in Germany when he got his first scale Airworld BAE Hawk jet. Trond has made 25 Airworld models for people worldwide. His scale craftsmanship is easily recognized and is neat, simple, functional, beautiful, works flawlessly, and is safe.

The crosswinds were challenging at times; however, when the first Mr. Top Gun, Bob Fiorenze, flew his F-14, he started smiling and has not quit smiling since. The F-14 was a three-year build, and was converted from ducted fans to 18-pound-thrust turbines. There are custom-made 100-ounce fuel cells per side, a custom swing wings, and custom electronics. It is done Rustoleum Black gloss spray paint and no clear cote. The rivet detail is burnt in. It uses power from five airborne batteries: two receiver, tow turbine ECU, one LiPo for the swing wing.

Congratulations to Frank Tiano, and everyone involved, for another exciting, memorable Florida Jets. Do not miss an opportunity to attend one of Frank Tiano's Model Airplane Airshows. You will not be disappointed.

For more information, please contact franktiano.com. RCSF

Pablo Fernandez put on a nice show for the spectators flying his beautiful Rebel Pro. Check out how little rudder control his is using to knife-edge this model down the runway.

This U.S. Marines Vietnam era F4 Phantom was shown and flown by Team Horizon's Steve Striker. It is impressive on the ground and in the air, we love the rockets under the wings.

Robert Lynch and his F-16 dazzled the jet fans with his low passes, nice rolls, smoke trails. Here is getting trip back to the pits, Ritchie Holt helping Rob Lynch provides you with a pretty good size comparison between man and machine.

Jack Diaz's Skymaster F9F Cougar was captured for this photo on landing approach. Notice the lower airbrake is deployed. The model was copied after the U.S. Navy's Jolly Rogers F9F.

Boli Muentes's F-16 comes if for a beautiful landing a Paradise Field. Boli's scale pilot Major Marley is modeled after his adorable daughter — pretty cool!

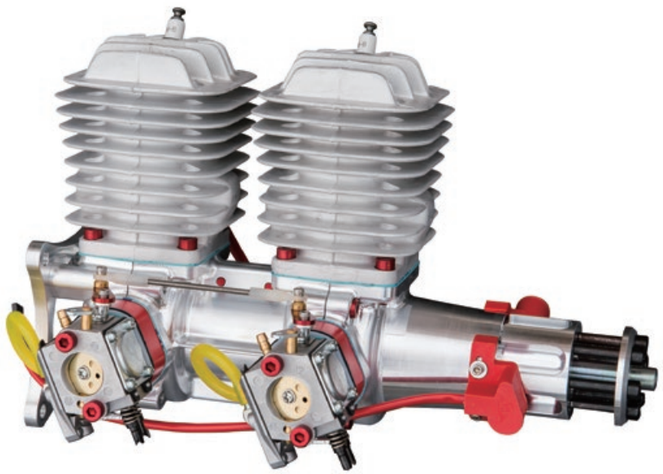
FLORIDA JETS 2015 SPECIAL AWARDS

Award	Sponsor	Aircraft	Winner
Best Military Jet - runner-up	Zap Glue	F-86	Vernon Montgomery
Best Military Jet	Model Airplane News	F-104	Ali Machinchy
Best Sport Jet - runner-up	Global Jet Club	Bandit	Tim Redelman
Best Sport Jet	Horizon Hobby	Futura	Kim Foster
Best Sport Color Scheme	JetCat USA	Futura	Pete Harasiewcz
Best Civilian Jet	CARF Models USA	Honda	Anthony Greco
Best Sport Jet Performance	Dreamworks RC	Shockwave	Franco DiMauro
Best Sport Jet Performance - runner-up	Ray & Robin's Hobbies	Rebel Pro	Pablo Fernandez
Best Scale Jet Performance	Elite Aerosports	F-16C	Dustin Buescher
Best Electric Jet Performance	Best in the West Jets	UPS DC-10	Robert Punnell
Best Multi Jet Performance	FLY RC Magazine	A-10	Craig Gottschang
Best Craftsmanship	Bob Violett Models	F-14	Bob Fiorenze
Most Outstanding Jet Flight	King Tech Turbines	Cougar	Peter Goldsmith
Special Recognition	RC Sport Flyer	YAK	Randy Clark
Special Recognition	Booma RC	Turbo-glider	Chuck Storie
Special Recognition	Spektrum Radio	Diamond	David Shulman
Special Recognition	EZ Balancer	Panther	Mark Shapiro
Special Recognition	Power-Box Systems	Cougar	Bob Curry
Special Recognition	Duralite Flight Systems	Mig-29	Bill Culberson
Special Recognition	Bavarian Demon	Ultra Bandit	Friedrich Mursch
Critic's Choice - runner-up	Frank Tiano Enterprises	L-39	Jorge Escalona
Critic's Choice	Zap Glue & Model Airplane News	F-104	Ali Machinchy

DESERT AIRCRAFT

AN INSIDE LOOK AT MADE IN AMERICA GAS POWER

BY WIL BYERS



The inline DA-100 is an example of the high quality design, engineering, and manufacturing that exemplifies the gas-powered engines made by the Desert Aircraft Company.

As I departed the Desert Aircraft company in Tucson, Arizona, I was struck by the realization that even the guy in shipping and receiving department knows more about gas-powered two-stroke engines than I do. Further, it certainly seemed Desert Aircraft's entire staff is seriously immersed in the designing, manufacturing, assembling, and shipping super high-quality RC and drone/UAV engines to customers all over the world. While it may be their day-to-day job, the people at DA truly appeared totally and completely dedicated to making certain you get a superb running and performing engine for your RC aircraft.

So when I entered DA's lobby I was greeted by the DA staff members. I was also taken aback by a historic 1959 Harley Davidson 165 that belonged to Dave Johnson's father. Seeing it gave me a sense of just how much Dave loves machines, and especially engines.

Then Dave met me in the lobby. He and I started to chat, and he began to explain the history of the company and how DA became an engine manufacture. He detailed how he had been a stone cutter in the jewelry making business, but also an RC pilot. He had been heavily involved in the Madera, CA giant-scale racer scene, and had become a 3W brand engine dealer in 1998. As sometimes happens, the business relationship with the 3W Company soured over time — a long story says Dave.

Dave Johnson is the owner of Desert Aircraft. He has made it DA's ongoing mission to produce superior engines, even from the startup, garage operation days.

Dave von Linsowe is a legend when it comes to engine design and engineering. His history is long in the Tournament of Champions and in desigining contest-winning engines.

As a result, Dave opted to start a company to manufacture competitive two-cycle RC engines. As such, he wanted to build high-quality engines for his would-be customers that were flying Tournament of Champions (TOC) type aircraft. Because of Dave's involvement in the TOC he had met Dave von Linsowe (DL). Dave von Linsowe was a Tournament of Champions competitor, but he was also an engineer from General Motors' Dephi division. DL had designed and campaigned world-class pattern airplanes as well as TOC aircraft. Consequently, DL knew internal combustion engine design well, how to build them, and how to make them run properly. Also, Dave Johnson had become acquainted with Ian Howard from Australia. Ian was an "electronics wizard" as Dave tells it. Ian offered to make an ignition system if Desert Aircraft needed them. So with Dave Johnson knowing where to get engine parts cast and machined, Dave von Linsowe knowing how to design and build engines, and Ian making good ignition modules, the new Desert Aircraft company would be launched from Dave Johnson's garage/house and backyard.

Interestingly, the first engine to be made by Desert Aircraft was the DA-150, a twin-cylinder, two-cycle engine. Dave says they made the 150 as a way to immerse the new company's product in the TOC competition scene quickly, and with a high-powered engine. So it was that in 1999 the DA-150 engine powered the third place winning airplane. This was followed by a 150 powering the winning airplane in 2000. Now of course, DA engines are used in most of the top International Miniature Aircraft Club (IMAC) competitors' airplanes as well as their 3D, freestyle aircraft.

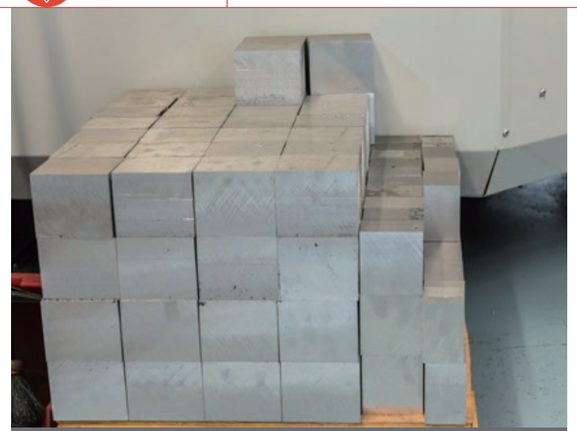
After Dave's quite enjoyable history lesson, we began our tour of the factory. Our first stop was in DL's office. There I was shown some of the historic photos of contest-winning airplanes and their pilots. Of course Chip Hyde, Mark Leseberg, and Quique Somenzini were but a few of the pilots mentioned, as were Gernot Buckmann and Andrew Jeskey. The list of winners that use(d) DA engines in their airplanes is, however, long and deep, so it was fun just to see the photos and hear a few of the stories behind them.

Dave von Linsowe also showed me some of his CAD drawings for the engines that he has engineered and designed. Let me tell you this guy must be a genius because every detail of the engineer is included in his drawings. Moreover they are done in 3D, which is to say he is wrapping his brain around the X, Y, and Z coordinates to create the complete engine line — this includes many of the tooling drawings as well. Think of it, one engineer has designed nearly all the engines in the Desert Aircraft product line, which runs the gamut from the DA-35 to the DA-200, and in their future a four-stroke, turbo-charged engine.

How Its Done

Cylinder heads are an extremely important part of DA engines, as Dave and Dave explained to me. This is because DA's cylinder heads are optimized for air-to-fuel mix coming into the combustion chamber and for purging the exhaust gases flowing out. It is worth noting that in a two-cycle engine the incoming air helps purge the cylinder of the spent gases. It is very important, therefore, to have optimized intake and exhaust ports that can accelerate the air/fuel mixture coming into and the exhaust

When you enter Desert Aircraft you'll immediately realize that Dave is into engines, as is attested by his father's restored 1959 Harley Davidson 165 that is showcased in the lobby.



A DA engine starts with a pile of aluminum blocks. Obviously DA uses aluminum that is the best quality money can buy as a way to avoid inclusions and such in the material.

Chris Gagne is DA's head machinist. Here you see him setting up a CNC machine to start cutting an engine block. The machine can cut forty eight blocks at a time once it starts a run.

gases leaving the cylinder.

To be able to create the unique cylinder designs used in DA's engines, DA uses a process known as investment or lost-wax casting, which lets them create the intricate shapes of the cylinders ports as well as the engines heads.

Let me try to explain the process. DL will design the tools needed to create the part. In the case of the cylinder head's tooling, the tool or mold is composed of about 20 pieces. The 20 pieces get bolted together. Once the tool is assembled, it is heated and a tooling wax gets injected into the mold. The mold and the wax are then left too cool. Once they have cooled, the tool/mold is taken apart, leaving the wax pattern of the engine part. The wax pattern (male part) is then immersed in a plaster of Paris designed for making ceramic molds. Note the mold will have sprues incorporated into it. When the plaster of Paris has cured, it gets heated in a kiln to about 2000 degrees Fahrenheit to melt and vaporize the wax so it will be completely evacuated from the mold. Next, using a slight vacuum applied to the ceramic mold's cavity, the molten aluminum is injected into the cavity, which then forms the part. Note that the ceramic mold must be heated during the process to nearly the temperature of the molten aluminum metal so that no voids or inclusions are created in the part. Once the aluminum has cooled to a solid the ceramic mold is simply melted away from the part by immersing it in water. It is worth pointing out that the ceramic material used to make the plaster of Paris molds is extremely fine, which results in very accurate and detailed engine parts. As a result, the parts do not require much finish work — what you see coming out of a Desert Aircraft engine box is pretty much what came out of the mold. It is one of the details that Desert Aircraft demands in terms of quality control, and what makes their motors top quality. Also, DA engines do not use a sleeve. Rather the bore of the cylinder head gets hard chrome plated. The bore is then finely honed to exacting specifications. This makes for the lightest possible part, with the greatest possible wear cycle.

The CNC machine can use up to 70 tools, which get swapped out as needed during a cutting run. The machine is a four and one half axis machine so it can cut nearly any shape.

Engine blocks are obviously an integral part of DA's engines. Chris Gagne is DA's head machinist. His job is knowing how to set up and run the computer, numeric, controlled (CNC) milling machines so it cuts the parts to DA's design specifications. DA's typical tolerances are +/-0.001 to =/-0.0001 inch.

What make's Chris' job special is that he must translate Dave von Linsowe's Solid Works computer generated design drawings into the machine code required by the CNC machines. It requires a lot of work to set the machines up properly. Dave Johnson told me it can take up to a week to set up the 4.5-axis horizontal milling machines for a new run. Also, DA's machines are designed for high production. Each machine has six-pallet carriages that can handle eight parts on the four-side pallet — 48 parts per carriage. So with two machines, Chris can do 96 parts at a run, with the machines running unattended overnight.

Also, Chris uses the CNC machines to mill crankshafts and rods. They are milled from a solid blocks of high-strength, lightweight steel. The less expensive rods are typically contracted out to another company for production. Note that the tailings from the block, crankshaft, and rod making get recycled, so nothing goes to waste.

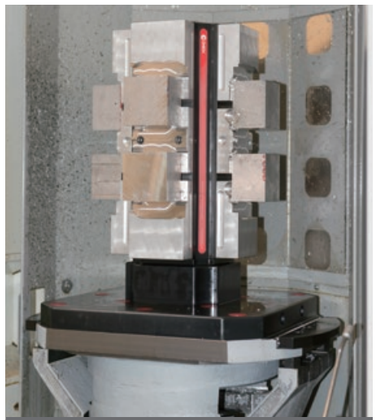
Parts such as bearings, seals and gaskets are contracted out as well.

Quality control for all of Desert Aircraft's engines is done at each of the respective assembly station. Brian Gilmore, however, is the head of the quality control (QC) division. He has oversight on nearly all the processes to make certain that you get the best engines money can buy. Additionally, Brian does the QC oversight and documentation for the engines that are sold into the Unmanned Aerial Vehicle (UAV) market. Even the measurement tools for the UAV products must meet QC standards and be well documented, so this is no small task within the organization.

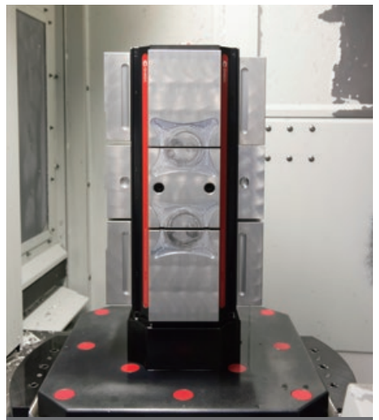
Testing and tuning engines at DA is performed by their lead test engineer, Lawrence Bolton. Lawrence not only does the testing and tuning, but he designed and built DA's dynamometer. DA's dynamometer is used to measure the power produced by their engines. It is two

A crankshaft starts as a steel billet. The CNC machine turns it into the parts you see to the right of the billets. They are cut to the tightest tolerances, so the engine delivers the most power.

The HAAS CNC machine gets programmed via a design file, so it will cut the parts to the tightest tolerances. The engineer's parts drawings are turned into machine language.



It looks simple, but the machinist must set up the machine and the raw aluminum stock on the spindle properly, so the CNC machine can cut the parts quickly and accurately.



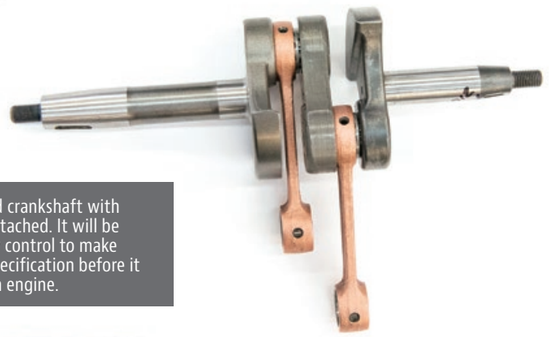
This is how the cut starts. This spindle gets indexed to different positions so it can cut any of the four sides of the part. Once it starts, the cutting is done automatically.

Here the machine is cutting the front of the engine block. The white liquid is lubricant and cooling fluid that must be used during the cutting process. The fluid and the aluminum shavings get recycled.

Chris holds a finished block for you to see its size. Notice the lightening holes that have been cut to keep DA engines as lightweight as possible. This is just one of the details that make their engines special.

Connecting rods start out looking like these. They come in as raw steel parts that must be machined to DA tolerances before they can go into one of their engines — quality steel makes for quality parts!

Here you see examples of some of DA's connecting rods after they have been machined to tolerances. Notice how they even get lightening holes cut into them for best performance.



This is a completed crankshaft with connecting rods attached. It will be checked by quality control to make certain it meets specification before it gets installed in an engine.

Engine parts are checked and double-checked on this XY coordinate machine to make absolutely certain the parts are being manufactured to the engineer's design specifications, as is called out in the drawings.

Even the engine porting is optimized for performance. DA uses a porting technigue that actually accelerates the air coming into the cylinder, which then helps purge the exhaust gases from the cylinder(s) and thereby creating more power.

Got heads? DA has just a few cyclinder heads waiting to get married to an engine block and piston. Each head is checked by quality control before it can be mated to the rest of the engine.

dynamometers in one: a steady-state (brake) and an eddy current type. Basically, a DA engine is attached to the dynamometer and then run at different rpm settings to get the torque and power that it produces at those settings.

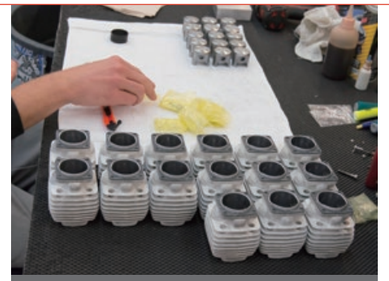
This is where the "propeller meets the air" I would say. Because the data that Lawrence and his team can acquire by testing on the dynamometer let's them give powerful feedback to the Don von Linsowe so he can optimize his designs. Not only that, it helps DA better understand what are optimum power settings for the carburetor as well as what propellers will work best for a specific engine.

It seems reasonable to say that Lawrence and his team are truly focused on helping DA design engines that truly give pilots an advantage over other engine manufactures. Moreover, I think we'll see DA offering even better engines in the near future — engines that will put pilots and their airplanes in the winners' circles.

Engine repair is a significant part of Desert Aircraft's success. Scott Whitmer is their lead repair person. Once an engine has been received, logged in, put on the repair shelf, and moved to his repair station, Scott will strip the engine, determine the extent of damage, and then repair it as needed so the engine is back to specification and running properly. However, when one of DA's precision specialty engines (DA-200, etc) is returned for repair, the repair is done by its engine builder. DA does this so the engine is repaired to like-new condition, which only its respective builder is capable of doing.

Customer support at Desert Aircraft is done almost exclusively by Tony Russo. Tony mans the phones at DA. He has a extensive history of knowing how to tune DA engines. So Tony can typically troubleshoot any starting, running or performance problem that a customer may have, and he can usually do it over the telephone. Also, Tony fills telephone orders. That said, DA sells tuned pipes, mufflers, and accessories. They also offer Xoar, Mejzlik, Menz, propellers, which are excellent matches for their engines. As Dave underscored, Tony is extremely capable of helping you match hardware to the engine your model's needs.

The Tucson Aerobatic Shootout is back on for 2015. Dave Johnson explained that the sponsors are currently entering too. The pilots have

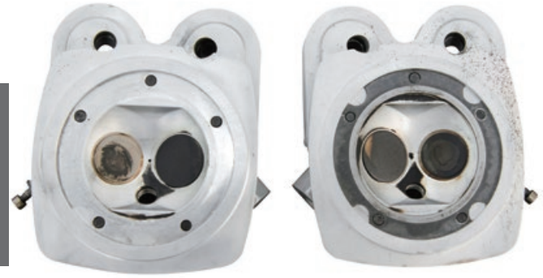


Notice how clean the workspace is at this assembly station. Engine assembly is meticulously done such that no foreign material enters the parts.

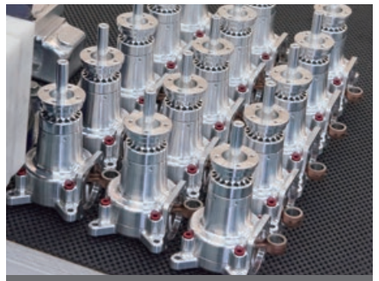
Engine parts are stored in labeled bins. That way they can be pulled as needed. In this case you have 200-cc fronts, centers, and rears. The assembly line system is well designed.

Each part must go through a cleaning operation before it is ready for assembly. Dave noted that even the cleaning fluid gets recycled, so nothing goes to waste at DA.

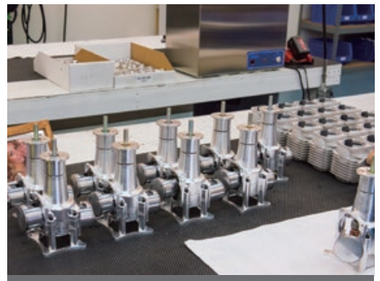
DA is testing some four-cycle engines that promise to deliver full-scale airplane engine type performance. These are some of the heads that they have been using on one of their test engines.



These are DA-85 crankshaft assemblies and housings the will be married to their pistons and cyclinders. Again, look at how clean the work surfaces are kept.



This is another look at the DA-85 lowers waiting to be fitted with piston and cylinder. You can tell just by the finished parts that DA pays special attention to every detail.



This is an assembly station for the DA-100 engines. Here the crankcase with driveshaft, connecting rods, and cylinders are being fitted with their cylinders.

Just look at the quality of this assembly: crankcase, pistons and connecting rods are all made to the highest standard, with every detail being met with the utmost in quality control, so you get a top performing engine.

been chosen, as have the judges. It is scheduled as a four-day event, with the dates being October 14 thru 18.

DA's new online shopping cart should be in service by the time you read this article. Dave says it will streamline the order process significantly, which will speed the delivery of orders as well. Just point your browser at desertaircraft.com to see the new cart and their complete line of engines and accessory items.

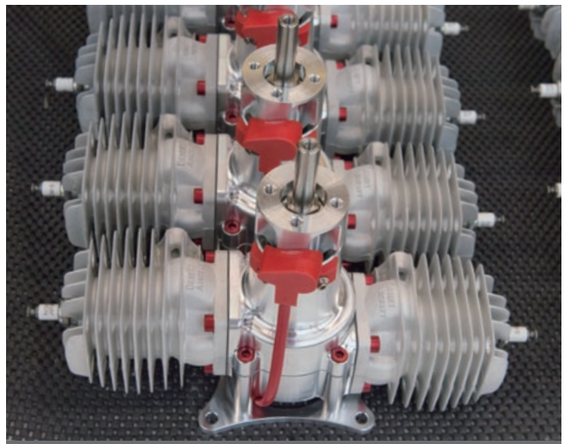
Synopsis

My visit to DA was nearly overwhelming in terms of the amount of information that was presented and that I needed to gather for this article. I left Desert Aircraft, however, knowing that this company is making extremely high quality engines that are priced extremely affordably, considering the optimized performance they are designed to deliver. I guess if I could sum it all up in but a few words, I'd have to say, when it comes to DA engines you are paying for what you get — that is high-end performance to the max!

RCSF

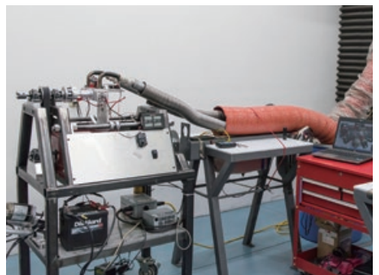
At this station the Walbro carburetors are being readied to be fitted to the engines. DA modifies the carbs to their specifications, including linkages, etc.

If you've got a big airplane, DA has a four-cylinder engine that will pump out some real power for your model. It is their DA-200, which are the cylinder heads shown here.

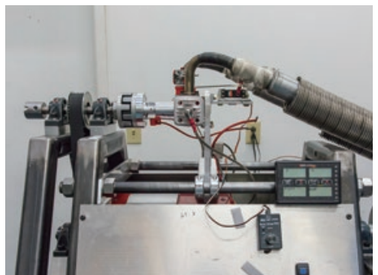


These are DA-170s ready for boxing and shipping. As you can see, the attention to detail is shown everywhere on these engines. DA says, no engine gets shipped without a complete quality check.

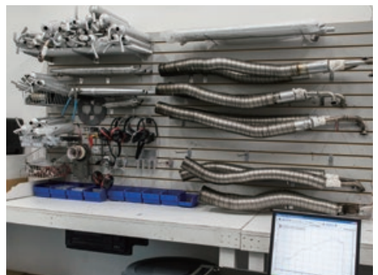
On the cart and off to the boxing department these DA-170 engines go. Check out the huge exhaust ports on their heads. These engines make power for world championship pilots' airplanes.



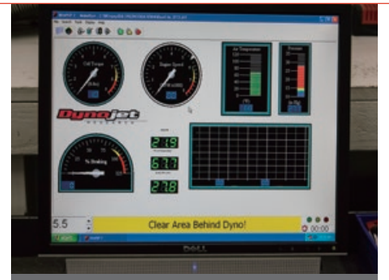
Lawrence Bolten is DA's lead test engineer. He designed and built this dynamometer for testing DA engines. It is both a mechanical (power) and an eddy current dyno.



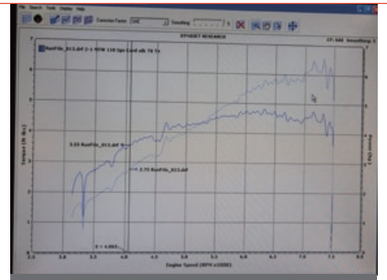
Obviously DA is using this dynamometer to optimize their engines' power. The engineers use the data gathered to tweak their designs and the settings for better performance.



This hardware let's the engineers do their dynamometer tests with different exhaust systems, so you'll know exactly how a DA engine will perform in your model — cool!



DA is using Dynojet software to capture data from their dynamometer. This gives DA an huge advantage over others in understanding real-world engine performance.



The graph is displaying engine rpm (X axis) versus torque (Y axis), with horspower being displayed to the right side of the the Y axis. There is the 3.55 and 2.75 runfile displayed.

Can you say turbo charger? DA has been working on putting a turbo charger on their four-stroke engine to get the most power out of the new engine — this is the good stuff.

DISTRIBUTOR

Desert Aircraft
1815 South Research Loop
Tucson, AZ 85710
Phone: 520-722-0607
desertaircraft.com

If your airplane's engine needs repair it will come into DA here. It will get a tagged as to the problem and then go to a technician that will take it apart for a rebuild and repair.

Richard Hastings does the shipping and receiving at DA. He makes certain your engine or part will get to you without damage and that an engine returned for repair is logged into the system properly.

Dave Johnson showed me around the warehouse and explained how the products get inventoried and shipped. It is amazing to think that the Desert Aircraft Company started in Dave's backyard.

DA has a complete line of wooden and carbon fiber propellers too. They are typically a good match in terms of optimized performance for any of the engines in DA's product line.

Tony Russo handles the phones and troubleshooting for DA. He has a long history of using DA engines and knows all the tweaks that one might need to get an engine running optimally, if there should be a problem.

L/R: Chris Gagne, Alex Kanaval, Dalton Zajac, Casey Johnson, Richard Hastings, Terry Johnson, Scott Whitmer, Dave Johnson, Steve Malisewski, Dave von Linsowe, Lawrence Bolten, Bryan Gillmore, Tony Russo.

BUILD

PREPARING ABS ACCESSORIES

THE ABCS OF MAKING ABS FIT PROPERLY

BY JEFF TROY

The woodwork for my Dynaflite Super Decathlon has been completed, and the model's individual airframe components are now ready to be covered with 21st Century Fabric by Coverite. This readiness, however, has not included anything about preparing the ABS cowl and wheel pants that come with this fun-to-build kit.

Because I like to keep my finishing procedures grouped for each model in this series, these ABS accessories will be addressed now, so they may be painted within the same general time frame I've set aside for the Decathlon's fabric covering.

I use Bob Smith Industries (BSI) Insta-Cure + medium CA for most of my models' basic construction. Insta-Cure thin CA and Maxi-Cure thick CA are also used where needed. When epoxy is called for, BSI Quik-Cure (5 minute), Mid-Cure (15 minute), and Slow-Cure (30 minute) epoxy are my choices. For filling seams in ABS parts or creating fillets, Pacer Industries ZAP Finishing Resin mixed with micro-balloons or milled fiberglass is another excellent choice because it's so much easier to sand than epoxy.

1 Use sturdy scissors to cut away the excess plastic from ABS parts. Keep the cuts approximately 1/16-in. outside of the molded-in parting lines, and never let the blades snap closed.

2 Use a flat Perma-Grit tool or an Easy-Touch Bar Sander to bring the straight-line scissor cuts up to the parting lines. Use files or Perma-Grit shapes for any curved areas.

3 Check the fit of the cowl parts and tape them together. Check the fit over the fuselage, then use medium CA to glue the cowl parts together from the inside.

4 A sanding drum with coarse paper in a rotary tool is ideal for removing unwanted plastic in the cowl. Get close to the edges, but save some meat for hand-sanding.

5 Files, Perm-Grit tools (dual angle sander shown here), and sandpaper sticks in various shapes are all useful for finishing the edges of the cutouts. Use 320-grit sandpaper to clean edges.

6 Use a few drops of medium CA to tack-glue three or four 3/32- to 1/8-in. scrap-balsa spacers behind the spinner backplate. These ensure that the cowl-to-spinner clearance is perfectly spaced.

Thin sheets of ABS plastic are heated and pulled over a plug to create the different pieces of the cowl and pants, so before these parts can be assembled, the excess plastic must be trimmed away from the usable sections. I do this with a sturdy pair of scissors, cutting slightly outside of the molded-in parting line on each piece. When you cut the excess away, care must be taken to prevent the scissors from closing completely at the tips of the blades, especially near any corners or sharp bends in the parts. Snapping the blades closed could result in a nasty split in the plastic, and you won't like that at all. Hobbico makes a pair of small, curved scissors intended for trimming excess plastic away from RC car bodies, and the curved blades are extremely handy for cutting into the tight corners of ABS airplane parts.

After the parts have been scissor-cut to approximately 1/16-in. from the parting lines, I use coarse sandpaper on a Great Planes Easy-Touch Bar Sander to bring the cut edges up to the lines. Coarse sandpaper will leave a slightly fuzzy edge on the plastic, and this can be cleaned up with the 120-grit side of a Sanding Pad Dual Grit 120/240 from Stevens AeroModel or a small piece of 220- or 320-grit wet-or-dry sandpaper held in your hand.

Three parts form the cowl: top, chin, and nose. Trial fit the three together to see how they join, making any adjustments in their edges to achieve the neatest and tightest fit. Tape the parts together and apply beads of medium CA to the joints inside of the cowl. Make the necessary primary cutouts in the cowl—air intakes, air outlet, crankshaft clearance—with a coarse sanding drum on a rotary tool, and clean the edges with any combination of sanding sticks, files, and Perma-Grit shapes. Bolt the engine onto its mounting rails with the muffler removed, then slip the cowl over the forward fuselage. If necessary, open the hole in the nosepiece to clear the crankshaft.

Before any final cutouts can be made in the cowl, it must be in the correct position. I have found the spinner backplate to be the best tool for getting the cowl in perfect alignment, and here's how I do it. Use a few drops of medium CA to tack- »

7 Slip the cowl over the fuselage, fit the spinner backplate, and draw the cowl ring up to the backplate. This determines the cowl's position, so tape it to the backplate.

8 Drill 1/16-in. pilot holes and secure the cowl with six #2 sheet-metal screws. No need to bottom out the screws; a few turns will do the job nicely for now.

9 Make the cutouts for the muffler, needle valves, plug, and fueling accessories. Remove a little plastic at a time; you can take it away but you can't put it back.

10 Trim the excess plastic away from the wheel pant halves. Regular scissors can do this step nicely, but the Hobbico RC car scissors is better for cutting the wheel openings.

11 One of the easiest ways to get dead-straight surface edges on ABS parts is to run the parts back and forth over a sheet of sandpaper on your work surface.

12 Trial-fit the wheel pant halves, and when they mate correctly, tape them together and apply medium CA to the seams from the inside. Repeat this procedure for the opposite pant.

13 Use slow-setting epoxy and a spring clamp to glue the plywood reinforcing plate inside of the pants. This plate strengthens the ABS around the mounting-screw blind nut and the axle.

14 Mix a batch of slow-setting epoxy or Pacer finishing resin, and add micro-balloons or milled fiberglass until a thick paste results. Use this mixture to fill seams in the components.

glue three or four scraps of 3/32-in. balsa to the rear of the backplate, then fit the backplate over the crankshaft. Washers, a length of brass tubing or the hub of a broken propeller can act as a spacer over the unthreaded portion of the shaft, then finger-tighten the propeller nut. Pull the cowl forward so that the propeller ring of the nosepiece aligns with the spinner backplate—the balsa scraps ensure ample and consistent clearance. Tape the nosepiece to the backplate, and drill six 1/16-in. pilot holes through the cowl and fuselage for the cowl-mounting screws. Use #2 sheet-metal screws to temporarily hold the cowl in position.

Remove the tape at the nose to be sure that the nosepiece and backplate are still in alignment, and make any necessary adjustments if they are not. Cut whatever holes are required for needle valve and glow plug access, and make a small cutout in the estimated location of the muffler. Remove the backplate, then remove the mounting screws and pull the cowl away from the fuselage. For gasoline or two-stroke glow installations, mount the muffler on the engine and reinstall the cowl, making the necessary enlargements in the initial cutout to clear the muffler. If you're using a four-stroke glow engine, making the cutout is easiest if you install the muffler mounting tube but not the muffler. Open the initial cutout to clear the tube, then finish shaping the cutout as you thread the muffler body onto the tube.

Remove the cowl and open the six mounting-screw pilot holes to 1/8 in. to clear the screws provided in the kit. Drive the mounting screws into the mating holes in the fuselage, then remove the screws and harden the threads in the wood with a few drops of thin CA. Do not use accelerator. Allow the adhesive to cure in its own time. If you think you'll be servicing the nose of the airplane regularly, you might want to consider replacing the cowl mounting screws with 4-40 machine screws, and equipping the fuselage with six brass 4-40 Threaded Inserts from Du-Bro Products. I did this for my airplane's wing strut mounting areas, and you can find the how-to in the December 2014 issue of RC Sport Flyer.

The wheel pants are next, and like the cowl parts, trimmed with scissors. Instead of sanding the cut edges with a bar sander, you might want to try sliding them back and forth over a sheet of coarse sandpaper on your work surface. Scissor the cutouts in the bottom of the pants to clear the wheels, tape the pant halves together, and glue them to each other with medium CA on the inside seams. Use epoxy to add the interior plywood plates over the mounting areas. After the epoxy cures, drill the clearance holes for the axles and mounting screws. Replace the sheet-metal mounting screws with 2-56 machine screws, and install blind nuts behind the plywood plates to accept the screws.

The model's cowl and wheel pans are now assembled and fitted, but the seams are visible. I will show you one of several methods that I use to treat seams in ABS plastic, although you might want to consider the alternate choice of leaving the seams visible. Visible seams in cowls and wheel pants are not so unsightly when you consider that they are also present on most full-scale aircraft. It's true that the seams may not be in scale locations, but most casual observers will not know that unless they are personally familiar with the subject you are modeling.

As a quick-and-easy alternative to filling and sanding, just apply rows of dummy rivets along each seam, approximately 1/8 in. from one or both sides of the join line. Dummy rivets are easy. Just mix a batch of white glue with a small measure of tap water, and use a craft-glue syringe to apply them: one small drop to mimic each rivet, approximately 1/2-in. to 3/4-in. apart along the line. You'll be surprised at how convincingly these faux rivets can appear after the parts are painted.

I used a mixture of 30-minute epoxy and Great Planes Milled Fiberglass to fill the seams in my Decathlon's ABS parts. However, the sanding task will go easier on you if you mix the fiberglass with Pacer finishing resin. Either way, mix the concoction into a thick paste that won't run, and use a fingertip to apply it sparingly over each seam. Keep the application light, because everything above the level of the surface must be sanded away, leaving only the material that fills the seams.

After curing overnight, I sanded the mix with the coarse side of a flat Perma-Grit tool, followed by coarse sandpaper on the Easy-Touch. My next step was to apply HobbyLite filler over the sanded areas to repair scratch marks from sanding, and any

15 After curing, sand the mixture flush with the surface, supporting the surfaces from the inside. Next, coat the sanded areas with HobbyLite filler to cover scratch marks and other irregularities.

16 I used the described epoxy/milled fiberglass and HobbyLite filler method on the seams in my Decathlon's cowl, wheel pants, and wing struts. A no-fill alternative is described in the text.

17 HobbyLite filler sands easily with a Sanding Pad Dual-Grit 120/240 from Stevens AeroModel. Start with the coarse side, then flip it over and finish the job with the fine side.

18 I've found that using a sanding drum in a rotary tool is one of the quickest, easiest, and best ways of sanding the final shape into the wheel pant openings.

19 ABS parts are not as rugged as fiberglass parts, but you can reinforce the high-stress areas around the mounting screw holes, from the inside, with small strips of fiberglass cloth.

» defects in my epoxy-fiberglass fill job. After the HobbyLite dries, sand it away with the 120-grit side of a Stevens Sanding Pad.

Use a sanding drum with a rotary tool to get the final shape of the wheel cutouts in the wheel pants, and any desired combination of Perma-Grit shapes, files, and sandpaper to put the final touches on the various edges on and openings in the cowl. Mount the pants and cowl to double-check your work, then remove them and set them aside, ready to be primed and painted when the model is being covered.

The Super Decathlon is now ready for covering with Coverite 21st Century Fabric and painting with Top Flite LustreKote. In the next installment, I will show you some of my time-proved methods for applying film coverings. The subjects will be two colors of Top Flite MonoKote for the upper and lower surfaces of my Great Planes Super Sportster 60.

Many of the techniques I describe in my series for RC Sport Flyer have been demonstrated in previous installments. If you are enjoying the series, and find your building skills improving from the information presented, please consider having back issues on hand for reference. Back issues can be ordered from the publisher, and subscriptions to the magazine are available at $19.95 for 12 issues. RCSF

20 My Super Decathlon is ready for fabric, and the ABS accessories are ready for paint. In my next installment, I'll cover my Great Planes Super Sportster with Top Flite MonoKote.

SOURCES

Bob Smith Industries
8060 Morro Rd.
Atascadero, CA 93422
805-466-1717
Bsi-inc.com

Coverite / Dynaflite
Great Planes
Hobbico
P.O. Box 9021
Champaign, IL 61821
greatplanes.com

Du-Bro Products, Inc.
P.O. Box 815
480 W. Bonner Rd.
Wauconda, IL 60084
800-848-9411
dubro.com

Perma-Grit
Traplet Distribution USA
816 N. Country Fair Dr.
Champaign, IL 61821
217-355-2970
Us.trapletshop.com

Stevens AeroModel
26405 Judge Orr Rd.
Calhan CO 80808
719-387-4187
Stevensaero.com

BUILDERS AND PILOTS CHOOSE ZAP
"Hi there, I'm Dino DiGiorgio and I am addicted to flying War Birds. Any type and from any era. My favorite though is an aggressive WW 2 model, one that flies fast and is agile. Pulling a couple of G's in a maneuver can stress an airframe but I find comfort in knowing I have used the strongest, finest quality CA and Epoxy adhesives on the Planet for my bird. I am still flying War Birds built over 10 years ago, built with ZAP!"
ZAP-A-GAP
Medium CA+
Gap Filling Formula
ZAP CA
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ZAPGLUE.COM
West Warehouse 760/246-6462 | houseofbalsa.com
Central Warehouse 630/584-7616 | robart.com
East Warehouse 863/607-6611 | franktiano.com

HOW TO

BUILDING SCALE FOR COMPETITION — PART I

PLANNING AND GOOD RESEARCH WILL ENSURE SUCCESS

BY TOM WOLF

Many of you have probably looked in awe at some of the really excellent scale airplanes that are featured in coverage of scale competition events such as the AMA Nationals, US Scale Masters Championships, and Top Gun. I have had numerous modelers approach me and ask what it takes to build a scale airplane for competition. Since I am about to embark upon my next scale project, I thought it would be instructive to document the process in multiple installments over the course of the project. The following are the steps that I go through whenever I tackle a new project. Other modelers may do things in a slightly different order, or have other steps that they go through, but I have found that this process works well for me.

John Cole's well executed DeHavilland DH-1A is an excellent example of a WWI era aircraft. He placed third in Expert at the 2013 US Scale Masters.

Ron Peterka built this very fine Stinson SR-5 high-wing monoplane. He has entered Team Scale at multiple Scale Masters events with Curtis Kitteringham as his pilot.

- Select aircraft type
- Select a specific airplane to model (serial or registration number)
- Determine the scale for the model (what size should it be?)
- Collect documentation and generate a draft documentation package
- Determine basis for build: Kit, purchased plans or "scratch"
- Planning
  * Engine selection
  * Establish servo requirements and installation location
  * Quality check plans or kit for scale accuracy and identify discrepancies
  * Develop corrective measures for any scale discrepancies
- Build and detail to match the aircraft being modeled

This first installment will cover the process of selecting the airplane that I will be building for my next competition airplane. The second installment will cover how to collect scale documentation and generate a draft documentation package. Future installments will cover the remaining topics through project completion.

AIRCRAFT SELECTION

Deciding on an aircraft type to model is driven by a number of considerations. In some cases, the desired subject might be an airplane that one has always held a particular fondness for, it may be of special sentimental value (i.e. a plane that one's father flew in the military), or the subject catches one's attention because it is obscure or rarely modeled. To ensure a rewarding build it is important that the builder be excited about the project. Selecting an airplane that is personally exciting reduces the chance of burn-out during the build process and thus it is more likely that a high-quality, thorough job is done while finishing and detailing the airplane.

Other considerations, of equal importance, include the anticipated flying qualities and complexity of the construction or mechanics. It is important to make sure that the subject is compatible with the building and flying skills of the

This well done Bellanca Super Viking was built by Dave Lovitt. It is a model of the full-scale airplane Dave owned. It includes a nicely detailed cockpit interior.

This F-100F Super Saber is owned by Jack Diaz. It is worth examining the weathering, and the ordinance Jack has added to make this airplane a contest winner.

This Grumman TBM-3 Avenger was the author's first competition aircraft. It featured folding wings, operating gun turret, and functional bomb bay door, plus could drop dummy bombs or torpedoes.

This 1/8-scale DH Mosquito FBVI was built by the author in 1991. It is a Brian Taylor design, and the plans were obtained from Bob Holman. It was refurbished and detailed for competition in 2003.

The author's current competition airplane is a 1/5-scale DH Mosquito, is shown behind his 1/8-scale version. Modeling the same airplane eliminated the need to generate a new scale documentation package for the larger Mosquito.

modeler. If one is highly motivated to tackle a project that requires flying skills beyond their current capabilities, then it is imperative to find a skilled pilot for the project and turn it into a "Team-Scale" effort.

In addition to the above, there must be a good source of information about the particular aircraft that is being modeled to support generating a complete scale documentation package. Sources for information include aviation books, Bob's Aircraft Documentation, an aviation museum, or an airport. The last two sources are ideal, because if the aircraft to be modeled is physically accessible, then the almost unlimited ability to take photographs and examine the aircraft in person will provide as much information as needed to do a thorough job of detailing the model to match the full-size subject.

Finally, if one is to maximize success at competitive events, I think it is also important that the subject aircraft catches the attention of the judges. While in a perfect world, with judging guides being uniformly applied, the subject matter would have no effect upon one's score. However, inevitably there is some amount of subjectivity or personal bias that creeps in. So to avoid having this work against me, I strive to select subjects that present well and are not commonly modeled. For example, if your competition airplane is a Piper Cub, and you are at a competition where there are six other Piper Cubs entered, you may find yourself disadvantaged relative to a competitor who shows up with a unique and otherwise attractive, equally well-executed airplane. It is simply a matter of human nature. So if it is the Cub's flying qualities you are after, maybe a Taylorcraft, Piper Pacer, or some other similar, but less frequently modeled aircraft might be a better choice.

PROJECT SELECTION

Ideas for my next scale project have been floating around my head for the last year or so. My current competition airplane is a 1/5 scale DH Mosquito, which I have been flying since November 2011. It is an excellent competition airplane and flies extremely well. However, it also is very complex, requiring significant maintenance to maintain an airworthy condition suitable for competitive flying. It also requires well over an hour of assembly and checkout before it is ready for flight. About the same amount of time is required for disassembly, cleanup and packing the aircraft back into the transportation trailer. This airplane requires a lot of effort, both at the flying field and in the workshop in between flying sessions.

For my next project, I am highly motivated to have a much simpler subject, one that can be flown with a significantly less intensive effort for maintenance, assembly, and flying. Some of the planes that I have considered range from WWI types, golden age, and the usual WW2 fighters and bombers, including possibly a re-do of the Grumman Avenger that I competed with about 12 years ago. Over time, I have pretty much scratched all of the WW2 aircraft off the list of possible

The Cessna L-19 Bird Dog, N5247G, is the subject of the author's next scale project. Access to the subject supports generating a documentation package and provides a valuable sources.

The Bird Dog is relatively simple, but there is much detail that must be modeled. Access panels, latches, aerials, fittings, and loads of rivets must be modeled to ensure high scores during static judging.

candidates because inevitably they do not meet the "low complexity, easy to fly and maintain" criteria. While the WW1 types are generally simpler, ground handling and flight qualities in windy conditions are big issues, so that era fell of my list of candidates as well.

As it turns out, a flying buddy of mine has a full-size Cessna L-19 Bird Dog at a local airport. After seeing his plane, I began to think that it might be a good subject. Obviously, the flying qualities of a Bird Dog are quite benign in comparison with the Mosquito. Other positive aspects of going with this subject include low complexity (single engine, fixed gear), access to the full size subject to support assembling the documentation package and to aid detailing the model, and a very high visibility, but relatively simple paint scheme (see photos). The Bird Dog is also not a commonly modeled airplane, so I won't expect to see multiple other examples during competition. On the negative side, it does not have the attention-grabbing appeal that some of the "heavy metal" warbirds have. But on the balance, given that I am seeking a change of pace from my current competition airplane, the Bird Dog is a reasonably good choice.

After tentatively selecting this airplane as my subject, I did a search for availability of plans to see if that might be a good avenue to go down, versus having to generate my own plans. I was able to find two sources (Hostetler Plans and Vailly Aircraft) for Bird Dog plans, with sizes in 1/5, 1/4, and 1/3 scale. At 1/5 scale, the model's wing span is 86.5 inches, ¼ scale yields a wing span of 108 inches, and 1/3 scale results in a wing span of 147 inches. For today's competition environment the 1/5 scale version is a little on the small side, so that choice was rapidly eliminated. While a 1/3 scale airplane would be quite impressive, the logistics of transportation and storage become an issue. The ¼ scale version is a reasonable compromise between the two and will fit nicely into my existing cargo trailer, together with my 1/5 scale Mosquito.

The final hurdle for turning this project into a "go" was confirming that my buddy would make his airplane available to me so that I could crawl around it and take photographs as necessary to support this project. As it turned out, he was enthusiastic about the prospect of a small version of his plane being flown in competition. He basically handed me the keys to his hanger, so access is absolutely no problem.

So that settles it. The project will be the Cessna L-19 Bird Dog, N5247G. Next month I will cover pulling documentation together for this airplane, and generating a draft documentation package. This data will be constantly referenced during the build of the model to ensure that the model matches the documentation and is an accurate scaled-down replica of my friend's airplane. RCSF

SOURCES

Bob Holman Plans	Bhplans.com/
Hostetler's Plans	Hostetlersplans.com
Vailly Aviation	Vaillyaviation.com/
Ziroli's Plans	Ziroliplans.com

JETI usa ESPRIT model

CENTRAL BOX 200

HOW TO SET UP A CENTRAL DISTRIBUTION SYSTEM

BY WIL BYERS

You can buy the best airplane in the world, and fly it with the best transmitter and servos money can buy. If, however, you are not controlling the servos with a receiver system that is in 100 percent communication with the transmitter, it doesn't matter how good the airplane and servos are, your model will have control issues. Then too, if the receiver it is using does not have isolated output on its power bus, it will only take one stalled or shorted servo to stop all the other servos in the airplane from working. Additionally, if your model's receiver is operating solo, your model is absolutely in Rf harm's way. That is, if your model has only one receiver and there is no diversity in terms of signal path it will only take one signal glitch to take your model out of the sky, which is not only costly, but also extremely dangerous.

There is certainly no need for a costly receiver system in a small, inexpensive model that does not carry a lot of inertia when it is flying. I would argue vehemently that large, powerful, and expensive airplanes must be equipped with a receiver system that has isolated outputs for the servos, uses redundant receivers for diversity of radio signal reception, and has dual power supplies that can be isolated from each other in the event that one pack dies.

Such is the case with Jeti Central Box 200 system, which is designed to provide exceptional control of your model aircraft. While not inexpensive, it seems quite reasonable to me to spend a little extra money over a typical receiver to outfit a large-scale model with such a receiver system.

This is how I configured my 6.6-meter wingspan Antares scale racer with the Jeti Central Box 200. It uses two 4200-mAh NiMH packs for power.

My 1/3-scale Fox aerobatic glider is set up with the Central Box 200 just under the pilot's seat. The model is fitted with two 3300-mAh LiPo packs.

FEATURES

- Control management with configurable servo outputs
- Power distribution with two independent inputs
- Firmware updatable via Jeti's USB adapter
- Jeti Duplex EX Bus or PPM compatible
- Wirelessly programmable using DC/DS Tx Device Explorer
- Independent receiver signal inputs (SAT1, SAT2) for diversity
- Up to 15x servo outputs with overload protection
- Up to 3x telemetry sensors inputs (Ext1, Ext/14, Ext/15)
- Input for included magnetic or optional wireless switch
- Input: 3.5 – 15 volts
- Output current: 2 x 10 amps continous w/ 90 amp peak
- Dimensions / weight 62 x 38 x 16 mm / 30g

This is what you get when you order the Central Box 200 with the magnetic switch. It comes as a complete package including battery connectors.

INCLUDES

- Jeti Central Box 200
- 2 Jeti Duplex EX R3/RSW 2.4-GHz receiver
- Magnetic wwitch
- Magnetic key
- Bind plug
- 2 Multiplex connectors
- 2 extensions
- Magnetic wwitch cover
- User manual
- Decals

EASY SET UP

The Jeti Central Box 200 (CB200) comes with two Jeti R3 type receivers and a magnetic switch, plus the magnet, two connectors, decals, and a manual. Alternately, you can get the CB200 with three R3 receivers, which lets you use one receiver as a digital switch — you can then turn your model's receiver system on and off from your transmitter rather than having to activate the

You can use the JetiBox as a monitor to get telemetry data and as a programmer. Once it is bound to the transmitter, you or your copilot can see the telemetry data from the CB200.

I added a three-position switch to my rudder stick to toggle between flight modes, but without the need to take my hands off the controls — it works extremely well.

I recommend you use three pins on the Multiplex connector per battery power lead, which makes for a good electrical connection. Be sure to use shrink tubing over the solder joints.

Receiver R3 number one is in the nose of my Fox glider, with R3 number two being located in the model's boom. This makes for good signal diversity.

switch in the model. I bought mine with the magnetic switch. Note the magnetic switch is digital rather than mechanical too, so there are no metal-to-metal contacts to fail.

Set up is easy; albeit, you must follow Jeti's step-by-step procedure. There is a video on YouTube.com too that will step you through the process if you find these instructions difficult to follow.

You'll start the CB200's set up by binding the R3 receivers to your Jeti transmitter — the transmitter I'm using is a DC-16. The setup process is straightforward: go to Menu, then Advanced Properties, Wireless Modes/Trainer, then under Mode select Double Path, and next to Pair primary TX module and then Pair secondary TX module. Note that I set my transmitter to Alarm at: Loss of any receiver, so it will annunciate if one of the receivers should lose communications with the transmitter — this is a great safety feature. In order to bind a receiver to the transmitter you must insert the bind plug into the EXT port on the R3 satellite that you will be binding and then power it. I used a six-volt NiMH battery pack to power the R3 receiver once the bind plug was installed — be careful to observe the proper polarity of the battery when powering the receiver. You can then click on the Pair primary RX module. The transmitter will generate a question asking you: Really use this receiver? You'll obviously need to answer Yes. Next you must pair the second R3 receiver to your transmitter following the same procedure.

The next step is to set up the Central Box 200 with the R3 receivers. For this step the receivers must be plugged into the RX1 and RX2 ports of the CB200 — you'll use the male-to-male servo connectors that are supplied with the Central Box 200. The port on the R3s that you connect to the CB200 is 4/Ext. The magnetic switch connects to the CB200's port label SWITCH. Next you'll need to connect a battery temporarily to the CB200 for the completion of the set up — I used its port one. Then you will exit out of Wireless Modes/Trainer back to the main menu screen. There you will navigate to Model and then Device Explorer. At Device Explorer you must select the first R3 receiver, which then lets you pick the option for the Serial Link. When you pick the Serial Link option you must then select the EX Bus option and approve that selection with an OK command. Note you will want to set the failsafe to Disable. The second R3 must be set to EX Bus as well. You'll then exit out to the Device Explorer menu.

To set up the CB200 you will go to device Device Explorer again. When you power the CB200 you will see the CBOX200 listed under the R3 EX option. You'll navigate to it and select it. Under CBOX200 you will find the following options: General Settings, Alternative Pin Config, Servo Fail-Safe, Servo Output Mapping, Telemetry, Telemetry Min/Max, and Reset to factory defaults. General Settings provides you with setting the Output Period and Expander Settings. I set my CB200 to Auto for the Output period, with the Expander Settings being set to Ext1. The Output Pin Config lets you pick between Servo, Digital Out and Digital In — the digital value represents a zero or one state for such things as monitoring gear doors, latches, alarms, etc., which is a powerful feature in terms of getting feedback form a model's state of control. Fail-Safe lets you Enable or Disable it, with each output pin being individually programmable for its respective function, with the Fail-Safe Delay letting you pick the length of time it holds in that condition when radio signal is lost completely by the dual path signal. Servo Output Mapping is very nice in that it lets you pick the output on the receiver that you want to use for control functions; i.e., for my Fox I'm using receiver outputs one and two for right and left ailerons respectively, and other ports as I want them. The CB200's Telemetry settings lets you configure the settings as you desire. In the case of the Fox I'm monitoring Voltage, Current, and battery Capacity, but if you add sensors you can pick many more. Telemetry Min/Max is basically a storage area for telemetry data during a flight. You can, however, set up a switch to use to clear the data. For the obvious reasons, I would caution you must pick a switch you will not use during flight because toggling the switch will clear the data.

That's it for how to set up a Jeti Central Box 200.

This 6.6-meter wingspan Antares scale race glider is fitted with a Central Box 200 as a way to control the wings' eight control servos.

CONCLUSION

If you are into giant-scale, powerful, expensive models, I think spending a little extra money to get the insurance of redundant, dual path receiver reception, with isolated servo outputs, and redundant battery power is an absolute "no brainer."

Beyond the importance of security and safety, the Central Box 200 lets you configure your model as you would like it. When you combine its programming power via Jeti's Device Explorer and the Jeti transmitter programming you have flight control configurations that absolutely lower the pilot's work load, which is to say it makes your model easier to fly. That makes you a better pilot at the airfield.

Furthermore, do not be put off the Jeti Central Box 200 because this review was done using gliders! Note that the Fox has interconnected flaps and ailerons plus four flight modes. While the Antares has six control surfaces on its wings, plus spoilers. I has retractable gear too. For it I'm using four flight modes as well: normal, thermal, speed, and landing. The Central Box 200 made the programming sequences quick and easy to do. Moreover, I have the peace of mind that my model is going to always do what I command it to do, and I like that! RCSF

SOURCES

Esprit Model
1240 Clearmont St NE, Unit 12
Palm Bay, FL 32905
Phone: 321-729-4287
Espritmodel.com

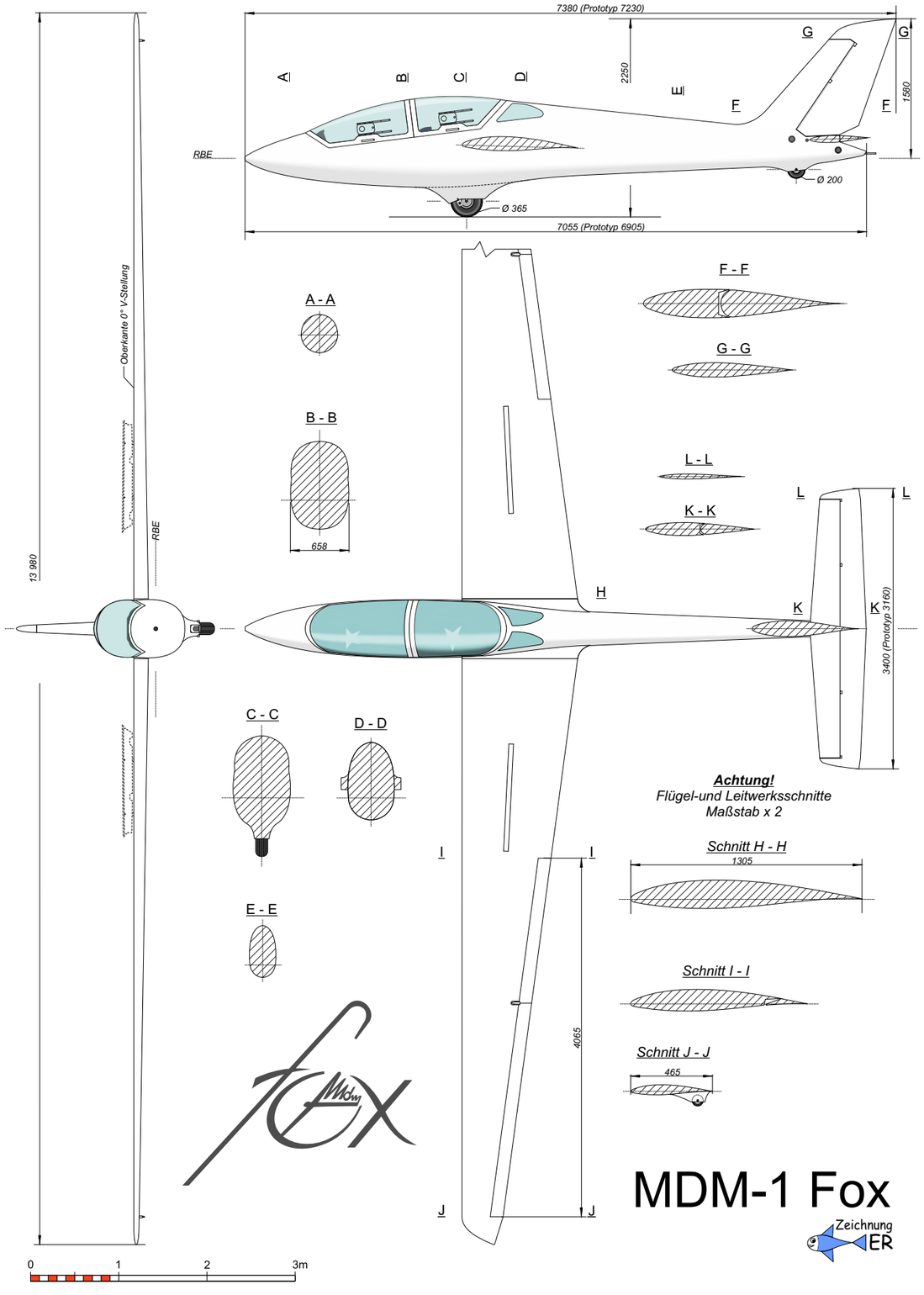
3-VIEW

MDM-1 FOX

DRAWINGS BY HANS-JÜRGEN FISCHER

The MDM-1 Fox is a Polish design. It was designed by Edward Margański — also the designer of the Swift. The MDM abbreviation stands for the production team Margański, Dunowski, Makula. Work on the Fox began in 1990, in parallel to the Swift's development. The Fox's maiden flight was on July 9, 1993. Just one month later it was flown at the 1993 World Glider Aerobatic Championships in Venlo, Netherlands. There, Jerzy Makula flew it to win the World Championship — his fifth World's win.

The MDM-1 Fox is composite, mid-wing, two-seater aerobatic glider with fixed undercarriage and conventional



low-tail configuration. Until now, the Fox is the only two-person aerobatic glider suitable to fly the spectrum of aerobatic maneuvers. Note that the prototype's wings were essentially still those of the Swift. Therefore, it was limited to a max. speed of 250 km/h and to +7 and -5 g, even when flown solo. Also, cockpit space was quite restricted, particularly in the rear seat. So the series version got strengthened wings, while the fuselage's front was lengthened, making the cockpit more comfortable.

The Fox has earned its pilots a number of championships. It has also been a very valuable glider for aerobatics training due to its dual pilot arrangement. Consequently, even very complex and unlimited figures can be learned in the Fox in the safety of an instructors training. Even so, the glider as a very aggressive stall as compared to a normal glider. As such, a number of fatal accidents have been the result of over-confident pilots pushing the outside of the envelope. Note that an aerobatic glider like the Fox has a high wing loading, so it can be stalled at any airspeed by abrupt control movements, which can result in significant loss of altitude before recovery. It is known that when the Fox is flicked with maximum elevator deflection, the angle of attack becomes very steep, with recovery only possible after several rotations. This looks quite spectacular, but the loss of altitude is considerable, and can be disastrous.

The MDM Fox went into production in late 1993 and was then stopped in 2005, with 36 built. Then in 2011, the company relaunched production and announced it would produce a small number of the glider.

It is worth pointing out that glider aerobatics pilots are some of the best pilots in the world in that they are unequalled in learning the art of energy management! For an exciting video of just what full-on aerobatics looks like in a glider point your browser here: youtu.be/J3NyptGJzLo.

RCSF

SPECIFICATIONS

Crew :	Two
Length :	7.38 m (24 ft 3 in.)
Wingspan :	14.00 m (45 ft 11 in.)
Wing area :	12.3 m² (132.4 ft²)
Aspect ratio :	15.9
Empty weight :	345 kg (761 lb)
Gross weight :	525 kg (1,157 lb)
Maximum speed :	281 km/h (175 mph)
Stall speed :	84 km/h (53 mph)
G limit :	+9.0/-6.0 (one occupant)
G limit :	+7.0/-5.0 (two occupants)
Maximum glide ratio :	28
Rate of sink :	1 m/s (200 ft/min)

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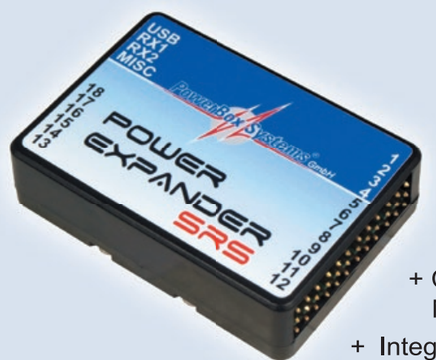

+ The unique channel expansion unit from **PowerBox Systems**
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+ Integral SRS for use of two receivers: full receiver redundancy
+ Compatible with: Futaba, Spektrum, Graupner, Jeti, Multiplex and JR
+ Integral heavy-duty socket: optional MPX high-current connector or original Ultra Deans
Please contact our main dealers Chief Aircraft INC., Dreamworks model products, Aircraft International or Duralite Flight Systems - They have our products on stock
www.powerbox-systems.com

REVIEW

Graupner USA

ULTRA DUO PLUS 80

IT'S TWO BIG PORTS OF POWER

BY MAX KEPPLER

The Ultra Duo Plus 80 is a well-made and engineered charger. It has two 20-amp charge ports and can be powered by an 11 – 28-volt DC source.

There are numerous good RC battery chargers on the market for airplane, helicopter, glider enthusiasts. It can, however, be quite a serious challenge trying to pick one that will charge different pack chemistries well and that uses a direct current (DC) source for field charging. Many chargers are made with lightweight materials so they are not well suited to an outdoor working environment such as that a typical RC charger will be exposed to at airfields. Further, many are quite honestly overpowered when it comes to their user interface and the less-than-friendly, complex programming logic.

Graupner's Ultra Duo Plus 80 seems to have found a niche in the RC market with its easy-to-use programming interface, 11- to 28-volt DC input, and the rugged durability of charger that you might find on professional technicians workbench or in their toolbox.

You get everything you need to start charging batteries in the pack. It comes with two XH balancing boards, so you may want to buy a TP board for packs of that type.

FEATURES

- Multi channel (2 channels for 1000 watts)
- 20 memories per output
- High-contrast LCD screens (128 x 64) with blue backlighting
- Delta-peak cutoff detector for NiMH and NiCd cells with adjustable delta peak scanning
- Internal battery resistance display
- Protective circuit technology (low-input voltage, over-current voltage, over-temperature, short-circuit, etc)
- Optimized software for charging and discharging
- Durable metal case

INCLUDED

- ULTRA DUO PLUS 80 charger
- EH to XH 7S adapter board
- 2 adapter cables
- DC input cable
- 2 charging cables
- 2 temp sensor
- 2 alligator clips
- Manual

The connections to the battery are extremely straightforward. For the ElectriFly® 3S 2200-mAh pack I built a charge lead with the Multiplex type connector.

HOW TO

At first glance I found the Ultra Duo Plus 80 to be somewhat different from Graupner's other chargers, but then I'd gotten pretty used to using their Polaren, which uses a touchscreen input system. The 80 uses a more basic interface with six buttons doing all the programming work rather than a touch screen.

As an example of its button-driven interface, you need only hold the MODE button when you power the unit to navigate to the **System menu** where you can set the LCD contrast, LCD backlighting, and the user name. The LCD contrast can be adjusted from 01 to 30, and the LCD

This is the welcome screen that you'll get when you turn the Ultra Duo Plus 80 on. Notice you can enter a user name, so your friends will know who they borrowed it from!

You will toggle through the different programming screens by toggling the ESC button. Cycle view shows the charge data for the last battery cycled on the output.

Memory Set is used to set up the charge and discharge parameters for a pack. You set the current and the pack voltage for a full charged and for the discharge value.

Here I've started a storage charge on the pack on output number one. When the charge starts the charger will check the status of the battery and if it is connected properly.

The lighter display portion represents the charge port two pack. The display shows percent, temperature, time, sensor, peak temperature, and battery resistance.

Here you see the unit in it constant current to constant voltage display mode. You get time, input voltage, peak voltage, and average voltage readings.

This screen is displaying the values for time on charge, current capacity delivered, charge voltage and the charge current. The displays are very easy to understand.

You can adjust the Terminal Capacity Selection (TCS) so that the charge will either generate a warning or to alternately halt the charge process safely.

At this screen you can read the battery's capacity and voltage or the discharge capacity and voltage. You will step through the packs with the INC and DEC buttons.

» backlighting can be turned on or off. The username includes uppercase and lowercase letters, number, and a few special characters.

In this system menu programming is done with the INC or DEC buttons, in conjuction with the ENTER button to select or highlight a particular parameter. Once the value has been set with the INC or DEC button you simply confirm that value and store it with the ENTER button. Once you've used this programming interface it becomes quite intuitive.

You'll want to use a 12- to 28-volt DC source that can deliver a minimum of 25 amps to power the Ultra Duo Plus 80. I'm using a deep-cycle marine battery. The charger comes with a G4 type charge lead and a pair of nice large alligator clips. It is reverse polarity protected too. So, just connect the alligator clips to the battery and the charger will power up and take you to the welcome screen. After a few seconds the unit will automatically advance to the **Input Power Setting** screen. At this screen you can set the input voltage and input current of the power supply system being used. You can also set the output power per port as a percentage value as well.

You'll navigate to the main programming screen after you've set the power settings by pressing the ESC button. You can choose between charge ports by pressing the channel (CH) button. The port to be charge is the one that is displayed normally (not reverse highlighted).

Once you've entered the active screen you can toggle between different display modes with the MODE or ESC buttons: MEMORY SET, USER SET, DATA VIEW, CYCLE VIEW, BALANCER VIEW.

User settings lets you select the temperature display type (C or F), the button beeps, the length of the melody, and what melody you want to play at the end of a charge cycle. It is easy to do, and probably best to select two different melody sounds per port.

Data view is where you'll be able to see the input voltage, the output voltage, the temperature sensors value (if your pack is fitted with one), and the maximum temperature of the selected pack on charge.

Cycle view is pretty self explanatory, but this menu lets see the charge and discharge data for the last battery that was cycled on a particular charge port. It shows the charge and discharge data as milliamp hours and voltage. You can view the data for up to ten cycles by toggling with the INC button.

Balancer view is only available for LiXX type battery packs. I like the way this data is displayed as a bar graph, with cell voltage. You can toggle thru the individual cells with the INC or DEC button. It displays only the two bars adjacent to the highest/lowest cell voltages, with the highest voltage displayed on top. The lowest cell voltage (lower bar) will vary to show the difference between the cells.

Mini-USB PC Interface provides you a way to keep the chargers firmware up to date. The mini-USB port is located on the back, left side of the charger. The cable is included in the charger's box. Note that Graupner is working with the manufacture of LogView software as a way to do data analysis. The software is named Donationware, and it can be downloaded from graupner.de or logview.info for free, so you can use it to do historical analysis.

CONCLUSION

While I was a bit challenged by the simplicity of the user interface of the Ultra Duo Plus 80, it soon became extremely easy to navigate. I found it was actually sometimes easier to use than the touchscreen once I had become accustomed to using it. I also like the ruggedness of this charger and that it can take the abuse of outdoor use at the airfield.

One of the things I really like about this charger is that it will deliver 1000 watts of power. Finally, I think it is value priced at only $189.00 plus shipping and handling. I'm sold! RCSF

DISTRIBUTOR

OPENHOBBY LLC
3245 University Ave,
Suite 1520
San Diego, CA 92104
Phone: 855-572-4746
Openhobby.com

SPECIFICATIONS

Battery	
Charge current :	2x 0.1 - 20 A / 2x max 500 W w/ external power 11 – 28 VDC
Discharge current :	2x 0.1 - 10 A / 2x max. 50 W w/ external power 11 – 28 VDC
Memory :	20 per output
NiCad & NiMH batteries	
Cell count :	1 - 18 cells - charge, discharge, cycle
Charging programs :	automatic, normal, linear and reflex
Charge type :	Δ peak: NiCad 5 – 25 mV/cell, NiMH 0-peak, 3 – 15 mV/cell
Trickle charge :	Off, <500 mA, automatic (1/20 charge current)
Cycle :	1 – 10 cycles interval 1 – 30 minute variable
Sequence :	charge → discharge, discharge → charge, variable
Maximum capacity :	10 – 150%
Lithium batteries	
Cell count :	1-7 cells - charge, discharge, storage mode
Cell voltage :	3.3 volts (LiFe), 3.6 V (Lilo), 3.7 V (LiPo)
Maximum capacity :	10 – 120%
Charge rate :	1 – 5 C
TCS capacity :	10 - 100%
Lead-acid batteries	
Cell count :	1 – 12 cells - charge, discharge, storage mode
Cell voltage :	2 V
Miscellaneous	
Operating voltage : range, DC input	11.0 to 28 V
Car battery required :	12 V, min. 60 Ah
Mains PSU for DC input :	12 – 28 V, min. 30 A stabilized)
No-load current drain :	≈210 mA
Low-voltage cut-off :	≈10.7 volts
Balancer socket :	EH, 1...7 LiPo/LiIo/LiFe cells
Balancer current max :	≈350 mA LiPo/LiIo/LiFe
Temperature sensor :	10– 60° C / 50 – 150° F
Safety timer :	20 – 300 min, off
Weight :	≈1300 g
Dimensions :	≈172 x 178 x 70 mm
Price :	$189.00 (#6480)

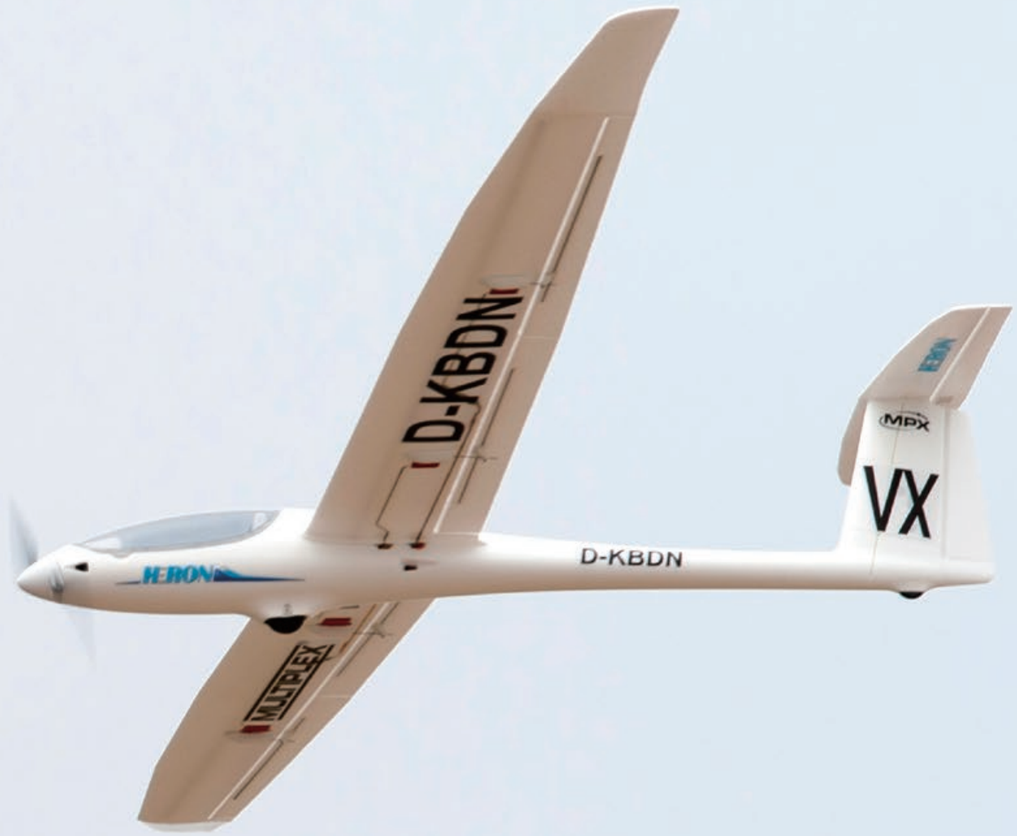
MULTIPLEX®

HERON

A GLIDER THAT WILL ABSOLUTELY TAKE YOU TO NEW HEIGHTS

BY WIL BYERS

The folding propeller fairs in neatly against the fuselage to reduce the model's motor-off drag to the absolute minimum for thermal soaring.



Motor-on performance will let you climb the Heron at about a 70-degree angle without stalling. You'll get multiple climbs too from the 2200-mAh LiPo pack.

After many years in this great hobby, I can remember quite a number of outstanding models that simply stood out as particularly mention worthy. The new Multiplex Heron 95-in. wingspan, electric-powered, foam glider is just such an airplane/glider.

While you may have read the ads and thought to yourself that this is just another Elapor foam glider with detachable wings and horizontal tail, you should think again. This is anything but the typical foamy. The Heron is a very capable soarer, either with electric power in the nose or as a pure glider.

However, as I assembled it in my shop I couldn't help but wondering if this machine would really deliver on the manufacturers claims as an "high performance" electric-powered glider.

While it looked great in my shop, T-tail, flaps and all, I wanted to really wring this machine out to see if it had the performance that I would want from an affordable, foam glider — one that could be assembled in 30 minutes or less.

I planned to fly it both in windy, slope lift and in flat-land thermal conditions, where it would need to indicate lift well. So...

FEATURES

- Elapor foam construction with detachable wing and tail sections.
- CFRP/aluminum tubular spars in the wings, with flaps and ailerons.
- Detachable wings and stabilizer for ease of transport.
- GRP "M" space technology designed fuselage for rigidity.
- Brushless outrunner motor that is factory installed.
- Ailerons, rudder, elevator, flaps, and motor controls
- 12 x 6 MPX folding propeller
- Clear canopy with detailed cockpit
- Main wheel and tailwheel

INCLUDES

- 2.4-meter wingspan glider RR
- 300- to 400-watt 36-mm outrunner motor
- Multiplex servos with extensions

This is how your Heron RR will come out of its kit box. You get everything you'll need except for battery and transmitter. You can assemble it in about 30 minutes or less.

- Two micro, four sub-micro servos
- 40-amp ESC w/ BEC

NEEDED – RR VERSION

- 3S 2200-mAh LiPo battery (ElectriFly® used)
- Hitec X1 Touch 55-watt battery charger used
- Hitec Aurora 9X transmitter used
- Hitec Optima 7 receiver used
- LiPo charging bag

FLIGHT REPORT

After charging the ElectriFly LiPo battery and programming the Aurora 9 transmitter, I wanted to maiden the glider at the slope. That way I could get plenty of air time on the model to get it 100 percent trimmed and tuned for thermal soaring. It would also give me some time to put the model through some aerobatics, without the need for multiple launches.

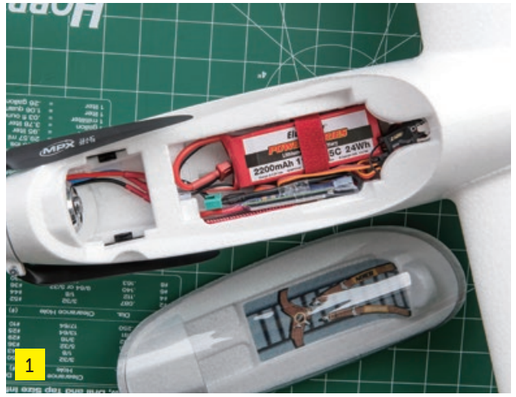
What I found out flying the Heron in slope lift in ≈20-mph wind at Eagle Butte was very impressive, especially in light of the fact that this is a foam glider.

First, it simply does not fly like a molded foam glider. It perfoms much

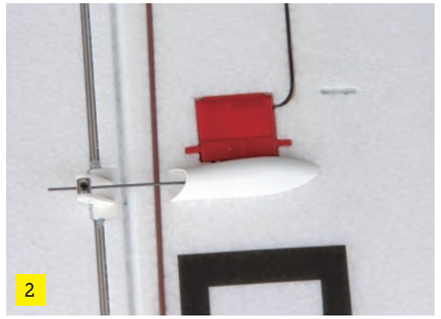
It is attractive model in the air, especially with its scale-like looks and T-tail. It soars as well as it looks, with plenty of penetration and superb handling.

You will like the performance this glider delivers. You can put it through its paces on the slope or in a thermal soaring environment.

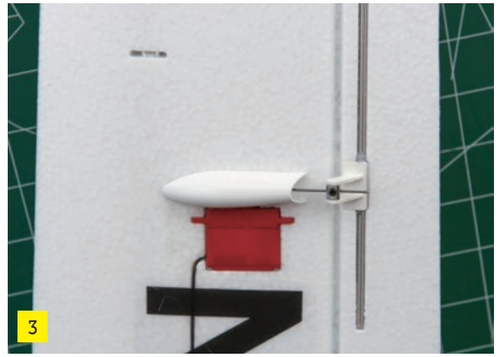
The Heron features a Schumann type wing planform that works extremely well for low=speed, minimum-sink thermalling.



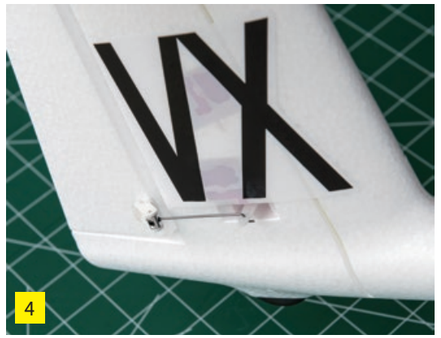
1 The ElectriFly 3S 2200-mAh LiPo pack delivers lots of power for the outrunner motor as well as capacity for multiple climbs to soaring altitude.



2 The flaps are reinforced at their leading edges with an aluminum tube. The pushrods from the servos run straight and true — no slop in them either.



3 The ailerons are also reinforced with an aluminum tube. The servos, linkages, and even the fairings come as you see them in the photos. It is a well-engineered model.



4 All the control linkages are well done, so you don't get hysteresis in them. I like the responsiveness of the all the controls too. It feels positive to fly.

5 The elevator's drive system is 100 percent slop free using this simple but elegant solution to the connection between pushrod and control surface.

6 The model includes both a main wheel and a tailwheel, which is great for landings on paved runways or closely mown grass — the wheels makes them fun too!

7 The MPX 12 x 6-in. plastic propeller comes factory installed too. You'll need to install a 2200-mAh LiPo pack, program the transmitter, and it will be ready to fly.

more like a glider of conventional construction or even hollow-molded composite. As such, the Heron penetrated against the wind without difficulty. Its carbon fiber/aluminum tubular spars in the wings delivered solid, rigid-wing performance. Even though the model does not have an accommodation for ballast, it just did not need it. It delivers plenty of speed and good maneuvarability. Also, it performs good loops, ok inverted flight, and I was able to roll it; albeit the rolls are not fast and perfectly axial. Dropping the flaps brought the model down nicely, and without the model building up too much speed — they work very well! Also, you'll discover the rudder has plenty of authority, so you can use it to push the glider around in very flat, cross-controlled turns if you want.

The slope soaring tests of the Heron went well. Next, I wanted to check out its thermal soaring capabilities. First I tested it at a park near my home. On three motor runs of about 15 seconds each I logged about 20 minutes on the model. Note that it needed absolutely zero trim changes on the rudder, elevator and ailerons, even while slope soaring. What I think you will like about this model is how well it indicates lift and then circles in it. The Heron is just easy to fly!

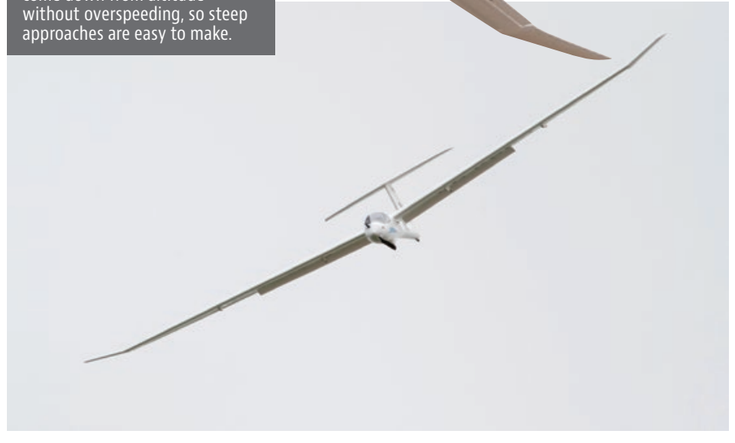
With those flight tests done, I was about ready to write my report. Then I took it to our annual alpine soaring event in Joseph, Oregon. At the high school's playfield I put the Heron up again. After about 15 seconds of motor run time, the model was at an altitude of about 600 feet, so I pulled the throttle back and commenced searching for lift. One hour and seven minutes later I landed the Heron so that I could go to get a hamburger — and, that was the only reason I landed it. In fact, while listening to music through ear buds on my iPhone a phone call came in. I answered the call while flying the model, and on a number of occasions I just let the glider circle in lift on its own, commenting to the caller that my Heron just made 12 circles in lift without my control inputs — it circles extremely well to put it mildly.

The Heron is a very svelt machine! It's a low-drag design that makes for exceptional performance in slope and thermal soaring conditions.

The maiden flight was done at Eagle Butte, with the winds blowing between 15 and 20 mph. The model has plenty of penetration for this type of soaring.

The handling of the Heron is extremely good, so it does exactly what you command it to do. It is also capable of mild aerobatics.

When the flaps are deployed the model slows well and will come down from altitude without overspeeding, so steep approaches are easy to make.



DEBRIEF

Multiplex's Heron is without question the best foam glider I've ever flown. It handles well, has plenty of penetration, indicates lift, and soars extremely well. Moreover, you cannot beat the $374.97 price for the RR version. I'll guarantee you'll get your money's worth out of this glider. RCSF

ASSEMBLY

You will not spend more than 30 minutes assemblying the 95-in. wingspan Heron glider. It goes together quick and easy.

I suggest you start with charging the LiPo battery. While it is charging, you'll want to fit the wings to the fuselage. The servos' connections have been labeled at the factory. Plug each wire into its respective connection and then slide the wing into the fuselage as outlined in the instructions. It will take you about three minutes per side. Once the wings are mated to the fuselage, be certain to push their locking pin into place. I tied a string to my model's locking pin to make it easy to remove when I want to take the wings off. It is a good design.

You'll also need to fasten the elevator to the vertical fin. This step will require another three minutes. You must marry the pushrod to the elevator's clevis, and then secure the elevator to the vertical fin with two plastic screws.

Next you will install the charged LiPo battery and program the transmitter. I recommend you turn down the control throws for each of the control functions before you energize and bind the receiver to the transmitter. Doing so will prevent over driving a servo. Then you'll want to program the transmitter as per the instruction manual. If you need my setup you can e-mail me and I'll provide my settings. However, I followed the manual's settings and my Heron is flying superbly.

That is about all there is the build. Hit the "gas" and go have fun!

CENTER OF GRAVITY

Place the CG at 2.55 in. behind the leading of the wing at the root. Note, you'll want 10% down-elevator compensation when you deploy full flaps.

SPECIFICATIONS

Wingspan:	95 in. (2.4 m)
Length:	43 in. (1.09 m)
Weight glider:	45.87 oz
Weight electric:	52.91 oz w/ power system
Wing area:	641 in.^{2}
Wing loading:	11.8 oz / ft^2
Transmitter:	Aurora 9X
Receiver:	Optima 7
Motor:	Outrunner
ESC:	40-amp w/ BEC
Battery:	3S 2200-mAh LiPo
Propeller:	MPX 12x6 folder
Price:	$374.97 RR (LXFFEK) $169.98 Kit (LXFFEJ)

DISTRIBUTOR

Hitec RCD

12115 Paine Street
Poway, CA 92064
Phone: 858-748-6948
hitecrcd.com

Don't worry about coming up short on an approach because you can simply add a little power to fly it to a perfect landing, such as here at Eagle Butte.

REVIEW

HORIZON HOBBY

HANGAR 9® ASW 20

IT'S A WINNER, COPIED AFTER A WINNER!

BY GENE COPE / WIL BYERS

The ASW 20 is a joy to fly! It controls are extremely well coordinated and it is not overly sensitive to elevator inputs. Also, the model has a fairly wide speed range.

You'll discover this model indicates thermals very well, so you'll be able to soar it for hours on end — to date we've logged more than five hours of soaring on the ASW 20.

The full-scale ASW 20 is an FAI 15-meter class sailplane. It was designed by Gerhard Waibel and was manufactured by the German company Alexander Schleicher GmbH. It was an evolution machine, with a fuselage nearly identical to its predecessor, the ASW 19, but with a new wing design that incorporated a new airfoil and flaps.

The prototype was maidened in 1977. It was an immediate success, with it winning multiple World Championships. To date, 765 have been built by Schleicher (until 1990) and another 140 were built under license by the Centrair company in France. The ASW 20 was eventually superseded by the formidable ASW 27 15-meter class sailplane.

The 20 was the first 15-meter wingspan glider to have a recorded lift-over-drag (L/D) ratio of 40-to-1. It was used by pilots to win the world triangle distance record of 892 miles, which was done in 1994 in a B model. While many 20s have been used to

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win championships in the past, they are still quite capable machines in the FAI 15-meter and Sports classes.

ASW 20 sailplanes are all-composite machines. The wing is distinguished by the fact that there is a flap-to-aileron interconnect that lets the flaps work in conjunction with the ailerons for speed and thermalling. Also, the wing incorporates a set of Schempp-Hirth type airbrakes for dethermalling and landing.

The model is built nearly to scale, with a 4.7-meter (185.5 in.) wingspan, which works out to 3.134 percent. It has been designed as either a pure soaring machine or for the optional E-flite electric motor power system as a limited motor run (LMR) sailplane.

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1 The ASW-20 comes with a painted fuselage and decals. The wings and horizontal stabilizer are balsa-sheeted foam cores that are covered in UltraCote film material.

2 Here are the parts you'll need to build the ASW 20 as a pure sailplane. I recommend you pick the package deal from Horizon Hobby because all the parts and pieces will fit well.

3 The 20 comes with a complete hardware package, including a carbon fiber joiner rod. The instruction manual gives you a step-by-step assembly procedure.

4 The model comes with an electric-powered retractable landing gear. Note that if you're running a high-voltage control system in the 20 you'll need an in-line regulator.

5 The landing gear works well in the model. Importantly, it removes all the hassles of installing a retract servo from the assembly process — just bolt it in and go.

FEATURES

- Scale outline of the full-scale
- Either pure sailplane or electric-powered
- Fiberglass fuselage with a high-gloss paint finish
- Balsa-sheeted, foam-core wing construction
- Carbon-fiber wing joiner and spar caps
- Pre-hinged flaps and ailerons control surfaces
- Ready to accept electric spoilers (optional)
- Balsa-sheeted rudder and horizontal stabilizer
- Cockpit tub and clear canopy
- Electric-powered retract ready
- Removable T-tail with pre-hinged elevator
- Complete hardware package included
- Genuine UltraCote® covering
- Scale decal set included

NEEDED TO COMPLETE

Sailplane

- AR9110 9-channel DSMX PowerSafe Rx
- 2 Spektrum 400-mAh 2S LiPo packs
- 6 Spektrum A5060 Mini HV servos
- 1 30-percent electric-powered retract
- 1 440-mm electric-powered spoilers
- Spektrum DX-9 transmitter
- Good-looking pilot

Electric

- Power 60 470Kv outrunner motor
- Phoenix Edge 100, 34-volt 100-Amp ESC
- E-flite 5000-mAh 6S 22.2-volt 30C LiPo battery
- E-flite 45-mm aluminum spinner
- Hangar 9 16 x 10 folding propeller

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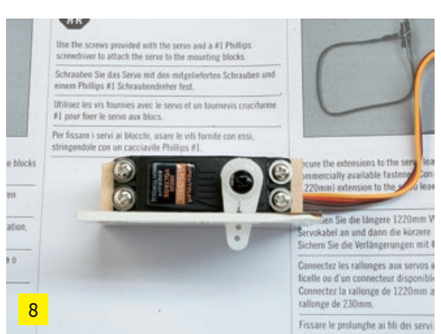
Use the screws provided with the servo and a #1 Phillips screwdriver to attach the servo to the mounting blocks.
Schrauben Sie das Servo mit den mitgelieferten Schrauben und einem Phillips #1 Schraubendreher fest.
Utilisez les vis fournies avec le servo et un tournevis cruciforme #1 pour fixer le servo aux blocs.
Per fissare i servi ai blocchi, usare le viti fornite con essi, stringendole con un cacciavite Phillips #1.

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6 If you opt to fly the model as an electric-powered glider you'll need the E-flite Power 60 motor and propeller to install in the nose of the 20.

7 The Power 60 motor will get power from a 6S 5000-mAh LiPo battery. Thje ESC is an 80-amp unit and the propeller is a 16x10 folding type, with a 1.77-in. spinner.

8 The servos are easy to install in that they simply attach to the plywood servo hatch covers. Be sure to center the servos before they are installed.

9 The servos' mounting blocks get glued to the plywood covers, so it is extremely important that you clamp them tightly to the wood while the glue cures.

10 Here you can see the aileron linkages are clean and well made, so they will easily provide the necessary control differential that eliminates adverse yaw.

11 This photo shows the flap linkage, which allows for the flaps to travel down about 80 degrees — the 20 makes slow, steep approaches for landing.

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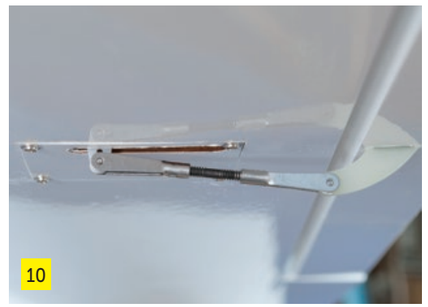

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SOARING - WIL

To say the ASW 20 excels in its size is no small thing, but it does. This 4.7-meter sailplane is a wonderful handling and soaring machine. I have literally hundreds of hours of slope soaring and thermal soaring logged in about every kind of glider and sailplane. So, to say this sailplane performs well is a pretty big mouthful for me. However, after logging five plus hours on the ASW 20 in slope and thermal conditions I can tell you without reservation that this model is a superb buy no matter how you analyze its flights.

After balancing the ASW 20 at its rear-most position of 4.125 inches and checking all the control throws a second time I opted to maiden the 20 at Eagle Butte in eastern Washington. I did the maiden in about a 15 mph wind, with gusts to about 20. The glider literally flew without any trim changes right off the building bench. Moreover, it didn't just hang there riding on the lift. It moved right out when I commanded with a bit of down-elevator control. It had no trouble penetrating the wind as well as indicating the lift that was drifting across the valley floor, so I was able to take it to altitude without much effort. During that maiden flight I only logged about 30 minutes.

The maiden flight was followed by many flights during the 2015 Scale Soaring Fun fly at Kiona and Eagle Buttes. At Kiona, the wind was blowing only about 12 mph. Even so, I was able to climb the model well on the available lift. I even took it half mile or so walking south on the ridge to feel out the model's handling in differing lift conditions. Again, it penetrated well, indicated lift well, and delivered excellent control coordinations — I fly with the rudder

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12 The control linkages get small ABS plastic fairings over them, which will reduce drag. They get glued in place on the covering with epoxy or Goop® type adhesive. They are a nice finishing touch to the model.

13 Here you see how the elevator's linkage is made. When you mount the elevator to the vertical fin you'll need to attach the servo arm to its servo, and remove it when taking the elevator off.

14 In this photo you see how the elevator servo gets mounted in the vertical fin of the ASW 20. The clevis attaches to the second hole in the control arm to get the proper amount of travel.

15 The gear doors use plastic hinges that get glued to the doors and to the fuselage. You must set the hinge back from their centerline a bit to allow for proper clearances.

16 These little wooden hooks must be glued to the gear doors. Rubber bands attach to the hooks and the landing gear to provide closures for the doors when the gear is retracted.

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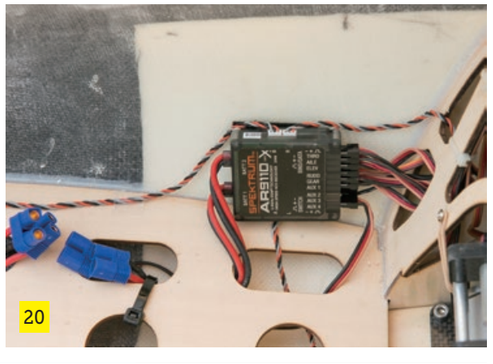
17 The model uses a very nice aluminum wheel, which is durable and functional for both grass and pavement takeoffs and landings. You'll find the 20's gear works extremely well.

18 Looking in the fuselage you can see there is plenty of rooms for all the control gear plus the retractable landing gear. It is quite an easy install. Note how we've mounted the receiver to the side of the fuselage, with three Rx satellites throughout.

19 We fitted the ASW 20 with two Spektrum 2S2P LiPo battery packs for redundant power. After an one-hour-plus flight the packs required only 680 milliamps to recharge fully.

20 The Spektrum AR9110 DSMX PowerSafe receiver is the perfect match for this model because it provides for two battery inputs, has nine control channels, and three satellite receivers. It has worked flawlessly in the ASW 20 during all our flights.



20

The Hangar 9 4.75-meter wingspan ASW 20 is an excellent choice for the pilot that wants to get into RC aerotowing. It tows well and soars exceedingly well.

The model is quite well done with its scale detailing quite close to that of the full-scale aircraft. The SG 1202 airfoil provides good lift-over-drag for super soaring.

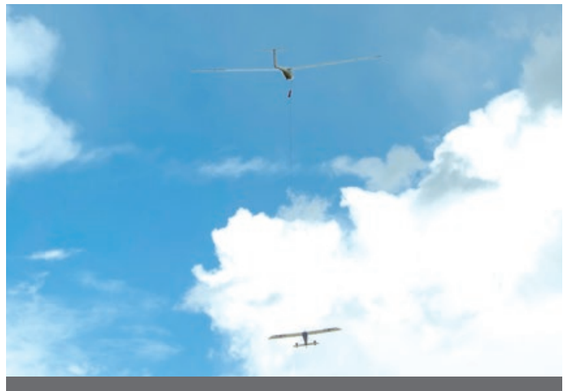
uncoupled to the ailerons, which I think is the way to get the best flight performance from a sailplane.

The next day at Eagle Butte, the wind conditions were light, but even still I was able to soar the model well. Over the back side of the hill, in the landing zone area, I worked a couple of thermals to get the model to well over 3,000 feet above launch altitude, maybe even higher. Afterwards, it was time to pass the transmitter around and let some other pilots fly it. They liked the model's handling and soaring capabilities too.

At the 2015 Yakima Aerotow event, I had only about four flights on the model. The model tows super well — you just keep the wings flat and let it follow the tug.

Off tow, each flight of this model delivered soaring performance that pleased me. During one flight I climbed it to an altitude that challenged my visibility, with other pilots saying that they could no longer see it. To get it down I simply opened the flaps to their 80-degree position and pointed the models nose down at about an 80-degree angle. The ASW 20 came out of the sky without any tendency to over speed or get near control surfaces flutter speed. Back down at about 1000 feet it was a joy to put the model thru some aerobatics, which included loops, split-S, inverted flight, and tight circles. Again, the model just delivered!

Deploying the flaps again and pointing the nose down at a 45-degree angle brought the glider to within rotation altitude. By just easing the nose of the model up, it bled off speed nicely to make superb landings after each flight.



The result of this aerotow was getting the opportunity to soar the model to "speck" altitude. The flaps make dethermalling the model easy when they are deployed to about 80 degrees.

The ASW 20 is designed to accept electric spoilers, but honestly you don't need them if you use full-flap deflections for landing. However, the spoilers will provide more scale-like landings approaches.

SYNOPSIS

The ASW 20 is in stock at horizonhobby.com. So do not wait one minute if you wanting an affordable, superb soaring scale glider. Get everything you need at the Horizon site too, and you'll have it built in about 16 hours. Importantly, you will get hours of soaring for this model, that is if you set it up as recommended in the instruction manual. Hangar 9 has done an outstanding job of manufacturing a capable soaring sailplane.

The only thing that I would change is for Hangar 9 offer an optional pilot figure. For our review model, we used a well-worn pilot that still had his "ticket" but had been grounded in Gene's shop. He did good! RCSF

DISTRIBUTOR

Horizon Hobby
4105 Fieldstone Road
Champaign, IL 61822
Phone: 217-352-1913
Horizonhobby.com

SPECIFICATIONS

Scale :	1/3.14
Materials :	Balsa / carbon / fiberglass / foam
Wingspan :	185.5 in. (4.70 m)
Length :	89.5 in. (2.74 m)
Wing area :	1623.0 in.^{2} (104.7 dm^2)
Weight :	19.5 lb (8.8 kg)
Wing loading :	27.5 – 29 oz/ft^2
Wing tube length :	27 in. (685 mm)
Wing tube OD :	0.625 in. (16 mm) solid carbon
Airfoil :	SG1202
Transmitter :	9-channel recommended
Receiver battery :	2 - 4000-mAh LiPo
Servos :	7 sailplane, 6 electric
Motor :	Power 60B 470Kv
Motor battery :	5000-mAh 6S 22.2-volt 30C LiPo
ESC :	80-amp min.
Propeller :	16 × 10 folder
Spinner :	1.77 in. (45 mm)
Colors :	White (U870), True Red (U866)
Flaps :	Yes
Retract :	Electric-powered optional
Price :	$999.99 (HAN4955)

ASSEMBLY GENE

Hangar 9's instruction manual is well written and organized. If you follow the manual, assembly will be straightforward. I recommend you use a checkoff procedure though so you do not miss a critical step.

You'll want to start with installing the servos in the wings. The servos get attached to the plywood servo covers. The covers get hardwood blocks glued to them. The servos are screwed to the blocks. You must make certain the blocks are glued securely to the plywood covers. The manual calls out 5-minute epoxy, but I recommend using 15-minute, with clamps to hold the blocks fast while the epoxy cures. You will also use 15-minute epoxy to fasten the control horns in their respective control surfaces. Be certain to measure the positions of the servos relative to the control horns so the control rods run true to the horns. I had to adjust one of the servos on its cover to achieve good alignment of the rod. Also, center the servos for the ailerons and flaps before installation. They must provide the proper differential as well as maximum flap deflection.

The elevator's servo mounts in the vertical fin. The procedure is documented well in the manual in photos and words. However, I suggest you be absolutely certain you use the proper length on the servo's control horn. Be certain to secure the servos' connection between the lead and its extension. Note the servo arm will be attached as you mount the elevator to the top of the vertical fin — at least that was easiest for me.

The fuselage comes with the plywood servo tray factory installed and the rudder servo is easy to install in it. You will, however, need to make up the pull-pull cables that drive the rudder. Make absolutely certain you get them taunt, without any excess slack. You want the rudder to stay centered and respond to control inputs without hysteresis. Then too, make certain the control horns are properly installed in the rudder, with equal distances on both sides.

In the pod of the fuselage, you'll simply bolt the electric-powered retract in position. If you have outfitted the model with high-voltage servos the retract must use a voltage regulator. It is as simple as plug and play. The gear doors use four plastic hinges, two per side. The hinges' center lines must be set back from the doors' openings so the door will open out and away from the opening, which makes for smooth gear operation both open and close.

The releasable tow hook servo is also easy to install. You only need to screw it into its respective place in the fuselage's plywood servo tray. You'll need to fasten the linkage to the hook too, but that is easy. What is important is making certain that when you program the transmitter the hook opens full and closes completely, which means you must adjust the servos travel volume appropriately.

I mounted the two LiPo battery packs up front as shown in the accompanying photos, just behind the release's servo. They are held in place by hook-n-loop material, with the hook side getting fastened to the plywood with cyanoacrylate glue. I used two strips per battery.

The Spectrum AR9110 DSMX receiver was fastened to the side of the fuselage with hook-n-loop material. As is shown in the photos, the receivers satellites were positioned around the fuselage to provide the best signal diversity. The receiver's switch was mounted on the rudder's servo tray for ease of access. That's it. Done.

CONTROL THROWS

	Low (Up/Down)	High (up/down)	Expo %
AILERONS	.83 /.4 in.	.90 / .47 in.	30
ELEVATOR	.5 / .35 in.	.6 / .4 in.	20
RUDDER	1.4 / 1.4 in.	1.6 / 1.6 in.	15

Center of Gravity 3.75 – 4.125 in. behind leading edge of wing at root

FLAPS	Landing (down)	Speed (up)	Cruise	Thermal (down)
	1.6 in.	0.8 in.	0.0 in.	0.2 in.

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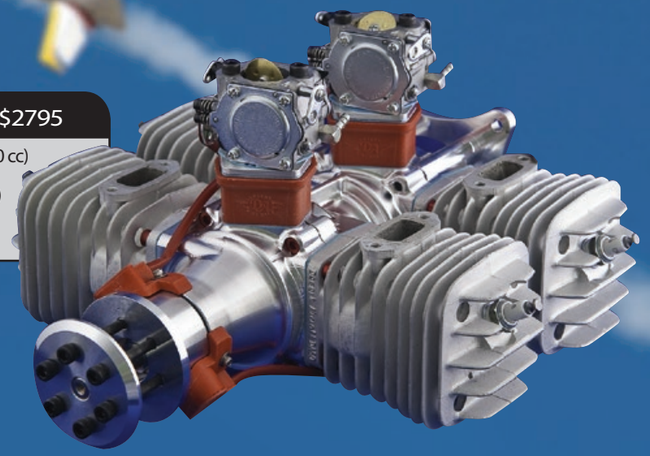

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Displacement: 12.20 cin (200 cc)
Output: 19 hp
Weight: 10.95 lb (4.95 kilos)
Length: 9.625 in. (244 mm)
Warranty: Two Years

DA-150 Price $1395

Displacement: 9.15 ci (150 cc)
Output: 16.5 hp
Weight: 7.96 lb (3.61 kilos)
Length: 7.67 in. (195 mm)
Warranty: Three year

DA-170 Price $1695

Displacement: 10.48 ci (171.8 cc)
Output: 18 hp
Weight: 8.05 lb (3.56 kilos)
Length: 7.67 in. (195 mm)
Warranty: Three year

DA-100L Price $999

Displacement: 6.10 ci (100 cc)
Output: 9.8 hp
Weight: 5.57 lb (2.53 kilos)
Length: 6.5 in. (162.5 mm)
Warranty: Three year

DA-120 Price $1199

Displacement: 7.4 ci (121 cc)
Output: 11 hp
Weight: 4.95 lb (2.25 kilos)
Length: 6.25 in. (159 mm)
Warranty: Three year

DA-50-R Price $549

Displacement: 3.05 ci (50 cc)
Output: 5.0 hp
Weight: 2.94 lb (1.33 kilos)
Length: 6.7 (170 mm)
Warranty: Three year

DA-85 Price $795

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